



Junos[®] OS

Interfaces Fundamentals for Routing Devices

Release
15.1



Modified: 2016-06-10

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

Juniper Networks, Junos, Steel-Belted Radius, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. The Juniper Networks Logo, the Junos logo, and JunosE are trademarks of Juniper Networks, Inc. All other trademarks, service marks, registered trademarks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Junos[®] OS Interfaces Fundamentals for Routing Devices

15.1

Copyright © 2016, Juniper Networks, Inc.
All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <http://www.juniper.net/support/eula.html>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

	About the Documentation	xli
	Documentation and Release Notes	xli
	Supported Platforms	xli
	Using the Examples in This Manual	xli
	Merging a Full Example	xlii
	Merging a Snippet	xlii
	Documentation Conventions	xliii
	Documentation Feedback	xlvi
	Requesting Technical Support	xlvi
	Self-Help Online Tools and Resources	xlvi
	Opening a Case with JTAC	xlvi
Part 1	Router Interfaces	
Chapter 1	Router Interfaces Overview	3
	Router Interfaces Overview	4
	Types of Interfaces Overview	4
	Understanding Permanent Interfaces	5
	Understanding Transient Interfaces	5
	Understanding Services Interfaces	7
	Understanding Container Interfaces	8
	Understanding Traditional APS Concept	8
	Container Interfaces Concept	9
	APS Support for Container-Based Interfaces	9
	Autocopy of APS Parameters	9
	Understanding Management Ethernet Interfaces	10
	TX Matrix Plus and T1600 Router (Routing Matrix) Management Ethernet Interfaces	11
	Understanding Internal Ethernet Interfaces	12
	T1600 Routers (Routing Matrix) Internal Ethernet Interfaces	14
	Supported Routing Engines by Router	14
	M7i Routing Engines	15
	M10i Routing Engines	15
	M40e Routing Engines	16
	M120 Routing Engines	16
	M320 Routing Engines	17
	MX5, MX10, MX40, and MX80 Routing Engine	17
	MX104 Routing Engines	18
	MX240 Routing Engines	18
	MX480 Routing Engines	19
	MX960 Routing Engines	20

	MX2010 Routing Engines	21
	MX2020 Supported Routing Engines	22
	PTX3000 Routing Engines	22
	PTX5000 Routing Engines	22
	T320 Routing Engines	23
	T640 Routing Engines	23
	T1600 Routing Engines	24
	T4000 Routing Engines	25
	TX Matrix Routing Engines	25
	TX Matrix Plus Routing Engines	26
	TX Matrix Plus (with 3D SIBs) Routing Engines	26
	Interface Naming Overview	27
	Physical Part of an Interface Name	27
	Logical Part of an Interface Name	33
	Separators in an Interface Name	33
	Channel Part of an Interface Name	33
	Interface Naming for a Routing Matrix Based on a TX Matrix Router	34
	Interface Naming for a Routing Matrix Based on a TX Matrix Plus Router	36
	Chassis Interface Naming	39
	Examples: Interface Naming	39
	Interface Encapsulations Overview	41
	Interface Descriptors Overview	52
	Physical Part of an Interface Name	53
	Interface Names for ACX Series Universal Access Routers	53
	Interface Names for M Series and T Series Routers	54
	MX Series Router Interface Names	54
	Interface Names for PTX Series Routers	55
	Displaying Interface Configurations Overview	55
Chapter 2	Configuring Physical Interface Properties	57
	Physical Interface Configuration Statements Overview	58
	Physical Interfaces Properties Statements List	68
	Interface Ranges	84
	Configuring Interface Ranges	84
	Expanding Interface Range Member and Member Range Statements	88
	Configuration Inheritance for Member Interfaces	89
	Member Interfaces Inheriting Configuration from Configuration Groups	90
	Interfaces Inheriting Common Configuration	91
	Configuring Inheritance Range Priorities	91
	Configuration Expansion Where Interface Range Is Used	92
	Specifying an Aggregated Interface	93
	Media MTU Overview	93
	Media MTU Sizes by Interface Type	94
	94
	Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers	95
	Media MTU Sizes by Interface Type for M40e Routers	96
	Media MTU Sizes by Interface Type for M160 Routers	97

Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers	97
Media MTU Sizes by Interface Type for MX Series Routers	98
Media MTU Sizes by Interface Type for T320 Routers	99
Media MTU Sizes by Interface Type for T640 Platforms	99
Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers	100
Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers	100
Encapsulation Overhead by Interface Encapsulation Type	101
Configuring Interface Description	102
Configuring the Media MTU	104
Configuring the Interface Speed	105
Configuring the Interface Speed on Ethernet Interfaces	105
Configuring Aggregated Ethernet Link Speed	106
Configuring SONET/SDH Interface Speed	108
Configuring the Link Characteristics	109
Interface Alias Names Overview	110
Example: Adding an Interface Alias Name	111
Clock Source Overview	115
Configuring the Clock Source	116
Configuring Interface Encapsulation on Physical Interfaces	117
Understanding Interface Encapsulation on Physical Interfaces	117
Encapsulation Capabilities of Physical Interfaces	117
Configuring the Encapsulation on a Physical Interface	118
Displaying the Encapsulation on a Physical SONET/SDH Interface	119
Configuring Interface Encapsulation on PTX Series Packet Transport Routers	120
Configuring Keepalives	121
Configuring the PPP Challenge Handshake Authentication Protocol	123
PPP Challenge Handshake Authentication Protocol	124
Configuring the PPP Challenge Handshake Authentication Protocol	124
Displaying the Configured PPP Challenge Handshake Authentication Protocol	125
Configuring the PPP Password Authentication Protocol On a Physical Interface	126
Understanding PPP Password Authentication Protocol	126
Configuring the PPP Password Authentication Protocol On a Physical Interface	126
Configuring the PPP Password Authentication Protocol On a Logical Interface	127
Configuring PPP Address and Control Field Compression	129
Configuring the PPP Protocol Field Compression	131
Monitoring a PPP Session	132
Tracing Operations of the pppd Process	133
Configuring the Router as a DCE with Frame Relay Encapsulation	134
Receive and Transmit Leaky Bucket Properties Overview	134
Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion	135

	Understanding Unidirectional Traffic Flow on Physical Interfaces	137
	Enabling Unidirectional Traffic Flow on Physical Interfaces	138
	Physical Interface Damping Overview	139
	Damping Overview for Shorter Physical Interface Transitions	139
	Damping Overview for Longer Physical Interface Transitions	140
	Damping Shorter Physical Interface Transitions	145
	Damping Longer Physical Interface Transitions	146
	Example: Configuring Physical Interface Damping	147
	Configuring Multiservice Physical Interface Properties	149
	Enabling or Disabling SNMP Notifications on Physical Interfaces	150
	Configuring Accounting for the Physical Interface	151
	Accounting Profiles Overview	151
	Configuring Accounting for the Physical Interface	151
	Displaying Accounting Profile for the Physical Interface	152
	Disabling a Physical Interface	153
	Disabling a Physical Interface	153
	Example: Disabling a Physical Interface	154
	Effect of Disabling Interfaces on T series PICs	154
Chapter 3	Configuring Logical Interface Properties	157
	Logical Interfaces Configuration Properties Overview	157
	Logical Interfaces Configuration Statements	158
	Logical Interfaces Statements List	161
	Specifying the Logical Interface Number	168
	Adding a Logical Unit Description to the Configuration	168
	Configuring the Interface Bandwidth	169
	Configuring Interface Encapsulation on Logical Interfaces	170
	Understanding Interface Encapsulation on Logical Interfaces	170
	Configuring the Encapsulation on a Logical Interface	171
	Displaying the Encapsulation on a Logical Interface	171
	Configuring Interface Encapsulation on PTX Series Packet Transport Routers	172
	Configuring a Point-to-Point Connection	173
	Configuring a Multipoint Connection	173
	Configuring the PPP Restart Timers	173
	Configuring the PPP Clear Loop Detected Timer	174
	Configuring the LCP Configure-Request Maximum Sent	174
	Configuring the NCP Configure-Request Maximum Sent	175
	Configuring Dynamic Profiles for PPP	175
	Configuring PPP CHAP Authentication	176
	Configuring the PPP Password Authentication Protocol On a Logical Interface	176
	Understanding PPP Password Authentication Protocol	176
	Configuring the PPP Password Authentication Protocol On a Logical Interface	177
	Configuring Accounting for the Logical Interface	178
	Accounting Profiles Overview	178
	Configuring Accounting for the Logical Interface	178
	Displaying Accounting Profile for the Logical Interface	179

	Enabling or Disabling SNMP Notifications on Logical Interfaces	180
	Disabling a Logical Interface	180
	Configuring Logical System Interface Properties	181
Chapter 4	Configuring Protocol Family and Interface Address Properties	183
	Protocol Family Configuration and Interface Address Statements	183
	Configuring the Protocol Family	186
	Configuring the Interface Address	187
	Configuring Default, Primary, and Preferred Addresses and Interfaces	189
	Default, Primary, and Preferred Addresses and Interfaces	189
	Configuring the Primary Interface for the Router	190
	Configuring the Primary Address for an Interface	190
	Configuring the Preferred Address for an Interface	191
	Configuring ICCP for MC-LAG	191
	Configuring IPCP Options for Interfaces with PPP Encapsulation	193
	Configuring an Unnumbered Interface	195
	Overview of Unnumbered Interfaces	195
	Configuring an Unnumbered Point-to-Point Interface	195
	Configuring an Unnumbered Ethernet or Demux Interface	196
	Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces	197
	Restrictions for Configuring Unnumbered Ethernet Interfaces	198
	Displaying the Unnumbered Ethernet Interface Configuration	199
	Displaying the Configured Preferred Source Address for an Unnumbered Ethernet Interface	200
	Displaying the Configuration for Unnumbered Ethernet Interface as the Next Hop for a Static Route	201
	Setting the Protocol MTU	201
	Disabling the Removal of Address and Control Bytes	202
	Disabling the Transmission of Redirect Messages on an Interface	202
	Applying Policers	203
	Overview of Applying Policers	203
	Applying Aggregate Policers	204
	Applying Aggregate Policers	204
	Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs	206
	Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs	206
	Configuring Hierarchical Policers	208
	Configuring a Single-Rate Two-Color Policer	209
	Configuring a Single-Rate Color-Blind Policer	210
	Configuring a Two-Rate Tricolor Marker Policer	210
	Applying a Filter to an Interface	212
	Defining Interface Groups in Firewall Filters	212
	Filter-Based Forwarding on the Output Interface	213
	Applying a Filter to an Interface	213

	Configuring Unicast RPF	217
	Configuring Unicast RPF	217
	Unicast RPF and Default Route	218
	Unicast RPF Behavior with a Default Route	218
	Unicast RPF Behavior Without a Default Route	219
	Unicast RPF with Routing Asymmetry	219
	Configuring Unicast RPF Strict Mode	220
	Configuring Unicast RPF Loose Mode	221
	Configuring Unicast RPF Loose Mode with Ability to Discard Packets	223
	Configuring Unicast RPF on a VPN	224
	Configuring Unicast RPF	225
	Example: Configuring Unicast Reverse-Path-Forwarding Check	226
	Understanding Unicast Reverse Path Forwarding	226
	Example: Configuring Unicast Reverse-Path-Forwarding Check	226
	Enabling Source Class and Destination Class Usage	235
	Source Class and Destination Class Usage	235
	Enabling Source Class and Destination Class Usage	238
	Understanding Targeted Broadcast	243
	Configuring Targeted Broadcast	244
	Configuring Targeted Broadcast and Its Options	244
	Display Targeted Broadcast Configuration Options	245
	Forward IP Packets On the Egress Interface and To the Routing Engine	245
	Forward IP Packets On the Egress Interface Only	246
Chapter 5	Configuring Circuit and Translational Cross-Connects	247
	Circuit and Translational Cross-Connects Overview	247
	Defining the Encapsulation for Switching Cross-Connects	249
	Defining the Encapsulation for Switching Cross-Connects	249
	Configuring PPP or Cisco HDLC Circuits	250
	Configuring ATM Circuits	250
	Configuring Frame Relay Circuits	250
	Configuring Ethernet CCC Circuits	252
	Configuring Ethernet VLAN Circuits	252
	Defining the Connection for Switching Cross-Connects	253
	Configuring MPLS for Switching Cross-Connects	253
	Configuring IS-IS or MPLS Traffic for TCC Interfaces	253
	Configuring ATM-to-Ethernet Interworking	254
	ATM-to-Ethernet Interworking	254
	Enabling ATM-to-Ethernet Interworking	255
	Configuring the Ethernet Interface	255
	Configuring Ethernet Encapsulation	256
	Configuring the Outer VLAN Identifier	256
	Configuring the Inner VLAN Identifier Range	256
	Configuring the Physical Interface VPI	256
	Configuring the ATM Logical Interface	257
	Configuring the Protocol Family	257
	Configuring the Logical Interface VPI	257

	Configuring the Logical Interface VCI	258
	Example: Configuring a CCC over Frame Relay Encapsulated Interface	258
	Example: Configuring a TCC	259
	Example: Configuring CCC over Aggregated Ethernet	260
	Example: Configuring a Remote LSP CCC over Aggregated Ethernet	262
	Example: Configuring ATM-to-Ethernet Interworking	264
Part 2	Special Router Interfaces	
Chapter 6	Configuring Discard Interfaces	269
	Discard Interfaces Overview	269
	Understanding Discard Interfaces	269
	Guidelines to Follow When Configuring a Discard Interface	269
	Configuring Discard Interfaces	270
	Configure a Discard Interface	270
	Configure an Input Policy	271
	Configure an Output Policy	271
Chapter 7	Configuring IP Demultiplexing Interfaces	273
	Demultiplexing Interface Overview	273
	IP Demux Interface Overview	273
	VLAN Demux Interface Overview	274
	Guidelines to Remember When Configuring A Demux Interface	274
	Points to Remember When Configuring an IP Demux Interface	274
	Points to Remember When Configuring a VLAN Demux Interface	275
	MAC Address Validation on Static Demux Interfaces	275
	Loose	275
	Strict	276
	Configuring an IP Demultiplexing Interface	276
	Configuring an IP Demux Underlying Interface	276
	Configuring the IP Demux Interface	277
	Configuring MAC Address Validation on Static IP Demux Interfaces	279
	Configuring a VLAN Demultiplexing Interface	280
	Configuring a VLAN Demux Underlying Interface	280
	Configuring the VLAN Demux Interface	281
	Configuring MAC Address Validation on Static VLAN Demux Interfaces	283
	Verifying a Demux Interface Configuration	284
Chapter 8	Configuring the Loopback Interface	287
	Configuring the Loopback Interface	287
	Configuring the Loopback Interface	287
	Example: Configuring Two Addresses on the Loopback Interface with Host Routes	288
	Example: Configuring Two Addresses on the Loopback Interface with Subnetwork Routes	289
	Example: Configuring an IPv4 and an IPv6 Address on the Loopback Interface with Subnetwork Routes	289

Part 3	Serial Interfaces	
Chapter 9	Serial Interfaces Overview	293
	Serial Interfaces Overview	293
Chapter 10	Configuring Serial Interfaces	295
	Example: Physical Interface Configuration Statements for Serial Interfaces	295
	Configuring the Serial Line Protocol	296
	Configuring the Serial Line Protocol	296
	Serial Interface Default Settings	296
	Serial Interface Default Settings	297
	Invalid Serial Interface Statements	298
	Configuring the Serial Clocking Mode	300
	Configuring the Serial Clocking Mode	300
	Inverting the Serial Interface Transmit Clock	301
	Configuring the DTE Clock Rate	301
	Configuring the Serial Signal Handling	302
	Configuring the Serial DTR Circuit	305
	Configuring Serial Signal Polarities	305
	Configuring Serial Loopback Capability	306
	Configuring Serial Line Encoding	308
Part 4	Monitoring and Troubleshooting Interfaces	
Chapter 11	Monitoring Interfaces	311
	Tracing Interface Operations Overview	311
	Tracing Operations of an Individual Router Interface	311
	Tracing Operations of the Interface Process	312
	Monitoring a PPP Session	313
	Tracing Operations of the pppd Process	314
Chapter 12	Troubleshooting Interfaces	317
	Configuring Interface Diagnostics Tools to Test the Physical Layer	
	Connections	317
	Configuring Loopback Testing	317
	Configuring BERT Testing	319
	Starting and Stopping a BERT Test	322
	Troubleshooting: em0 Management Interface Link is Down	323
	Troubleshooting: fxp0 Management Interface Link is Down	324
	Troubleshooting: Faulty Ethernet Physical Interface on an M Series, an MX Series, or a T Series Router	326
	Checking the Cable Connection	326
	Checking the Physical Link Status of the Interface	327
	Checking the Interface Statistics in Detail	328
	Performing the Loopback Diagnostic Test	330
	Checking Other Possibilities	332
	To Enable a Physical Interface	333

Part 5	Configuration Statements and Operational Commands	
Chapter 13	Configuration Statements	337
	[edit chassis] Hierarchy Level	354
	[edit interfaces] Hierarchy Level	356
	[edit logical-systems] Hierarchy Level	372
	[edit protocols connections] Hierarchy Level	376
	[edit protocols dot1x] Hierarchy Level	377
	[edit protocols iccp] Hierarchy Level	377
	[edit protocols lACP] Hierarchy Level	378
	[edit protocols oam] Hierarchy Level	378
	[edit protocols ppp] Hierarchy Level	380
	[edit protocols pppoe] Hierarchy Level	381
	[edit protocols protection-group] Hierarchy Level	381
	[edit protocols vrrp] Hierarchy Level	382
	[edit system processes] Hierarchy Level	382
	802.3ad	383
	accept	384
	accept-source-mac	386
	access-concentrator	387
	access-profile	388
	accounting	389
	accounting-profile	389
	acfc	390
	acknowledge-retries	391
	acknowledge-timer	392
	action (OAM)	392
	action (Policer)	393
	action-profile (Applying to CFM)	393
	action-profile (Defining for CFM)	394
	action-profile (Defining for LFM)	395
	action-red-differential-delay	396
	address	397
	advertise-interval	400
	age	401
	agent-specifier	402
	aggregate (Gigabit Ethernet CoS Policer)	403
	aggregate (Hierarchical Policer)	404
	aggregate (SONET/SDH)	404
	aggregate-ports	405
	aggregated-ether-options	406
	aggregated-sonet-options	407
	alarm (optics-options)	408
	alias (Interfaces)	409
	allow-any-vci	409
	allow-fragmentation	410
	allow-remote-loopback	410
	annex	411
	apply-action-profile	411

aps	412
arp (Interfaces)	413
asynchronous-notification	414
atm-encapsulation	415
atm-options	416
atm-scheduler-map	417
authentication	418
authentication-key	419
authentication-profile-name	419
authenticator	420
auto-configure	421
auto-discovery	422
auto-negotiation	423
backup-destination	424
backup-interface	425
backup-options	425
bandwidth (Interfaces)	426
bandwidth-limit (Hierarchical Policer)	427
bandwidth-limit (Policer for Gigabit Ethernet Interfaces)	428
bert-algorithm	429
bert-error-rate	431
bert-period	433
bridge-domain	434
broadcast	435
buildout (E3 or T3 over ATM Interfaces)	436
buildout (T1 Interfaces)	437
bundle	438
burst-size-limit (Hierarchical Policer)	439
burst-size-limit (Policer for Gigabit Ethernet Interfaces)	440
byte-encoding	441
bytes	442
calculation-weight	443
cbit-parity	444
cbr	445
cell-bundle-size	446
chap	447
chap-secret	448
circuit-type	448
cisco-interoperability	449
classifier	449
clear-dont-fragment-bit	450
clock-rate	451
clocking	452
clocking-mode	453
community	454
compatibility-mode	457
compression (PPP Properties)	458
compression (Voice Services)	459
compression-device	459

connections	460
connection-protection-tlv	460
connectivity-fault-management	461
container-devices	463
container-list	463
container-options	464
container-type	464
continuity-check	465
control-channel	466
control-polarity	467
control-signal	467
copy-tos-to-outer-ip-header	468
core-dump	468
crc-major-alarm-threshold	469
crc-minor-alarm-threshold	470
cts	471
cts-polarity	471
cycle-time	472
damping (Interfaces)	473
data-channel	475
data-tlv-size	476
dcd	477
dcd-polarity	477
dce	478
default-actions	478
default-chap-secret	479
default-pap-password	479
delimiter	480
demux-destination (Underlying Interface)	480
demux-destination (Demux Interface)	481
demux-options (Static Interface)	481
demux-source (Demux Interface)	482
demux-source (Underlying Interface)	483
demux0 (Static Interface)	484
demux0 (Dynamic Interface)	485
description	486
destination (IPCP)	487
destination (Routing Instance)	487
destination (Tunnels)	488
destination-class-usage	489
destination-profile	489
dial-options	490
dialer	491
dialer-options	492
direction	493
disable (Interface)	494
disable (Link Protection)	495
disable-mlppp-inner-ppp-pfc	495
dlci	496

do-not-fragment	497
domain-name	497
dot1x	498
down-count	499
drop (PPPoE Service Name Tables)	500
drop-timeout	500
ds0-options	501
dsr	502
dsr-polarity	502
dte-options	503
dtr	504
dtr-circuit	505
dtr-polarity	505
dump-on-flow-control	506
dynamic-profile (PPP)	506
dynamic-profile (PPPoE Service Name Tables)	507
dynamic-profile (Stacked VLAN)	508
dynamic-profile (VLAN)	509
dynamic-profiles	510
e1-options	517
e3-options	518
east-interface	519
egress-policer-overhead	520
encapsulation (Container Interface)	521
encapsulation (Logical Interface)	522
encapsulation (Physical Interface)	526
encoding	530
epd-threshold (Logical Interface)	531
epd-threshold (Physical Interface)	532
es-options	532
ethernet (Protocols OAM)	533
ethernet-policer-profile	536
ethernet-ring	537
ethernet-switch-profile	538
eui-64	539
evcs	540
event (LFM)	541
event-thresholds	541
fast-aps-switch	542
facility-override	543
failover-delay	543
family (Dynamic Standard Interface)	544
family	546
fastether-options	550
fcs	551
feac-loop-respond	552
filter	553
filter (Applying to an Interface)	554
flexible-vlan-tagging	555

flow-control	556
flow-control-options	557
force	558
forward-and-send-to-re	558
forwarding-class (ATM2 IQ Scheduler Maps)	559
forwarding-class (Gigabit Ethernet IQ Classifier)	559
forward-only	560
fragment-threshold	560
frame-error	561
frame-period	562
frame-period-summary	563
framing (E1, E3, and T1 Interfaces)	564
framing (10-Gigabit Ethernet Interfaces)	565
framing (SONET and SDH Interfaces)	566
gether-options	567
gratuitous-arp-reply	568
guard-interval	569
hardware-assisted-timestamping	570
high-plp-threshold	571
hello-timer	571
hierarchical-policer	572
hierarchical-scheduler (Subscriber Interfaces on MX Series Routers)	573
high-plp-max-threshold	574
high-plp-threshold	575
hold-interval (OAM)	575
hold-interval (Protection Group)	576
hold-time (APS)	576
hold-time (Physical Interface)	577
hold-time (SONET/SDH Defect Triggers)	579
host (Interfaces)	580
iccp	581
idle-cycle-flag	582
ieee802.1p	583
if-exceeding	583
igmp-snooping	584
ignore	585
ignore-all	586
ignore-l3-incompletes	586
ilmi	587
ima-group-options	588
ima-link-options	590
inactivity-timeout	590
indication	591
indication-polarity	591
ingress-policer-overhead	592
ingress-rate-limit	593
inner-tag-protocol-id	594
inner-vlan-id	595
inner-vlan-id-range	596

input	596
input-list	597
input-policer	598
input-priority-map	599
input-three-color	600
input-vlan-map (Aggregated Ethernet)	601
input-vlan-map	602
instance	603
interface (Hierarchical CoS Schedulers)	603
interface (IEEE 802.1x)	604
interface (IEEE 802.1ag OAM Connectivity-Fault Management)	605
interface (OAM Link-Fault Management)	606
interface (Port Mirroring)	607
interface-down	607
interface-name	608
interface-none	608
interface-range	609
interface-transmit-statistics	610
interface-set (Ethernet Interfaces)	610
interface-set (IP Demux Interfaces)	611
interface-shared-with	611
interface-status-tlv	612
interface-switch	613
interface-type (Interfaces)	614
interfaces	615
interfaces (Static and Dynamic Subscribers)	616
interleave-fragments	620
interval	620
inverse-arp	621
invert-data	622
ipsec-sa	623
iteration-count	623
iteration-period	624
keep-address-and-control	624
keepalives	625
key	626
l2tp-interface-id	626
lACP (Protocols)	627
lACP (802.3ad)	628
lACP (Aggregated Ethernet)	629
layer2-policer	631
lcp-max-conf-req	632
lcp-restart-timer	632
level	633
line-encoding	634
line-protocol	635
linear-red-profile	636
linear-red-profiles	637
link-adjacency-loss	637

link-discovery	638
link-down	638
link-event-rate	639
link-fault-management	640
link-layer-overhead	641
link-mode	642
link-protection	643
link-speed (Aggregated Ethernet)	644
link-speed (Aggregated SONET/SDH)	646
linktrace	647
lmi (Frame Relay)	648
lmi (Ethernet OAM)	650
lmi-type	651
local-name	652
local-password	653
lockout	653
log-prefix (Interfaces)	654
logical-interface-fpc-redundancy (Aggregated Ethernet Subscriber Interfaces)	654
logical-interface-policer	655
logical-systems	656
long-buildout	656
loop-timing	657
loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3)	658
loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)	660
loopback (Serial)	661
loopback-clear-timer	662
loss-priority	662
loss-threshold	663
low-plp-max-threshold	663
low-plp-threshold	664
lowest-priority-defect	665
lsq-failure-options	666
mac	666
mac-address (Accept Source Mac)	667
mac-address (VLAN and Stacked VLAN Interfaces)	667
mac-learn-enable	668
mac-validate	669
maintenance-association	670
maintenance-domain	671
master-only	672
maximum-contexts	673
maximum-requests	673
maximum-vcs	674
mc-ae	675
member-interface-speed	677
member-interface-type	678
mep	679
minimum-links	680

mip-half-function	681
mlfr-uni-nni-bundle-options	682
mode (Dynamic Profiles)	683
mode (Interfaces)	683
monitor-session	684
mpls (Interfaces)	684
mtu	685
multi-chassis-protection	689
multicast-dlci	690
multicast-only	690
multicast-statistics	691
multicast-vc1	692
multilink-max-classes	693
multipoint	693
multipoint-destination	694
multiservice-options	695
n391	696
n392	697
n393	698
name-format	699
native-vlan-id	700
ncp-max-conf-req	701
ncp-restart-timer	702
nd6-stale-time	703
negotiate-address	704
negotiation-options	704
neighbor (Automatic Protection Switching for SONET/SDH)	705
no-allow-link-events	705
no-aggregate-delegate-processing	706
asynchronous-notification	707
no-auto-mdix	708
auto-negotiation	709
cbit-parity	710
core-dump	711
feac-loop-respond	712
flow-control	713
gratuitous-arp-reply	714
no-gratuitous-arp-request	714
no-keepalives	715
long-buildout	716
loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)	717
mac-learn-enable	718
no-partition	719
payload-scrambler	721
no-pre-classifier	722
no-redirects	723
source-filtering	724
syslog (Monitoring)	725
no-termination-request	725

translate-discard-eligible	726
translate-fecn-and-becn	726
unframed	727
z0-increment	727
node-id	728
non-revertive (Interfaces)	728
oam	729
oam-liveness	732
oam-period	733
oc-slice	734
open-timeout	734
optics-options	735
option-82	736
otn-options	737
output	738
output-list	739
output-policer	740
output-priority-map	741
output-three-color	742
output-vlan-map (Aggregated Ethernet)	743
output-vlan-map (Gigabit Ethernet IQ and 10-Gigabit Ethernet with SFPP)	744
overflow (Receive Bucket)	744
overflow (Transmit Bucket)	745
override	745
pado-advertise	746
paired-group	746
pap	747
pap-password	748
partition	749
passive (CHAP)	750
passive (PAP)	750
passive-monitor-mode	751
password (Interfaces)	752
path-database-size	752
path-trace	753
payload-scrambler	754
payload-size	755
pdu-interval	755
pdu-threshold	756
peer	757
peer-unit	758
per-unit-scheduler	759
performance-monitoring	761
periodic	762
pfc	762
pic-type	763
plp-to-clp	763
plp1	764
point-to-point	765

policer (CFM Firewall)	765
policer (CFM Global)	766
policer (CFM Session)	767
policer (CoS)	768
policer (Interface)	769
policer (MAC)	770
policy-statement	771
pop	775
pop-all-labels	776
pop-pop	777
pop-swap	778
port	779
port-priority	779
port-status-tlv	780
post-service-filter	780
ppp-options	781
pppoe-options	782
pppoe-underlying-options (Static and Dynamic Subscribers)	783
preferred	784
preferred-source-address	785
premium (Hierarchical Policer)	786
premium (Output Priority Map)	787
premium (Policer)	787
preserve-interface	788
primary (Address on Interface)	789
primary (AS PIC or Multiservices PIC Interfaces)	789
priority (OAM Connectivity-Fault Management)	790
priority (Schedulers)	790
promiscuous-mode	791
protect-circuit	792
protection-group	793
protocol-down	795
protocols	795
proxy	796
proxy-arp	797
push	798
push-push	799
queue-depth	800
queue-length	801
queues	801
quiet-period	802
radius-realm	802
ranges (Dynamic Stacked VLAN)	803
ranges (Dynamic VLAN)	803
rate	804
rate	804
rdi	805
reassemble-packets	805
reauthentication	806

receive-bucket	807
receive-options-packets	807
receive-ttl-exceeded	808
red-differential-delay	808
redundancy-options	809
remote	810
remote-loopback	810
remote-loopback-respond	811
remote-mep	812
remove-when-no-subscribers	812
request	813
required-depth	814
restore-interval	815
retries	816
revert-time (Interfaces)	816
revertive	817
rfc-2615	817
ring-protection-link-end	818
ring-protection-link-owner	818
routing-instance	819
routing-instance (PPPoE Service Name Tables)	820
rpf-check (Dynamic Profiles)	821
rpf-check (interfaces)	822
rpf-loose-mode-discard	823
rtp	823
rts	824
rts-polarity	824
rtvbr	825
sa-multicast (100-Gigabit Ethernet)	827
sampling (Interfaces)	828
satop-options	829
shared-interface	830
scheduler-maps (For ATM2 IQ Interfaces)	831
schedulers	831
secondary	832
send-critical-event	832
serial-options	833
server	834
server-timeout	834
service (Logical Interfaces)	835
service (PPPoE)	836
service-domain	837
service-filter (Interfaces)	838
service-name-table	839
service-name-tables	840
service-set	841
services (Priority Level)	842
services-options	843
shaping	844

short-name-format	845
short-sequence	846
sla-iterator-profile	847
sla-iterator-profiles	848
sonet-options	849
source	851
source-address-filter	852
source-class-usage	853
source-filtering	854
speed (Ethernet)	855
speed (MX Series DPC)	856
speed (SONET/SDH)	857
spid1	857
spid2	858
stacked-vlan-ranges	859
stacked-vlan-tagging	860
start-end-flag	861
static-interface	862
supplicant	863
supplicant-timeout	864
swap	865
swap-push	866
swap-swap	867
switch-options	867
switch-port	868
switching-mode	868
symbol-period	869
syslog (Interfaces)	870
syslog (Monitoring)	870
syslog (OAM Action)	871
system-priority	871
t1-options	872
t310	873
t391	873
t392	874
t3-options	875
tag-protocol-id (TPIDs Expected to Be Sent or Received)	876
tag-protocol-id (TPID to Rewrite)	877
targeted-broadcast	878
targeted-distribution (Static Interfaces over Aggregated Ethernet)	879
tei-option	879
terminate (PPPoE Service Name Tables)	880
then	880
threshold	881
timeslots	882
tm	883
tm-polarity	883
traceoptions (Individual Interfaces)	884
traceoptions (Interface Process)	886

traceoptions (LACP)	888
traceoptions (PPP Process)	890
traceoptions (PPPoE)	893
translate-discard-eligible	895
translate-fecn-and-becn	896
translate-plp-control-word-de	896
transmit-bucket	897
transmit-clock	897
transmit-period	898
transmit-weight (ATM2 IQ CoS Forwarding Class)	899
transmit-weight (ATM2 IQ Virtual Circuit)	900
traps	901
trigger	902
trigger-link-failure	903
trunk-bandwidth	903
trunk-id	904
ttl	904
tunnel	905
underlying-interface	906
unframed	907
unidirectional	907
unit (Dynamic Profiles Standard Interface)	908
unit	911
unnumbered-address (Demux)	917
unnumbered-address (Dynamic Profiles)	918
unnumbered-address (Ethernet)	920
unnumbered-address (PPP)	921
up-count	922
user-prefix	923
username-include	924
vbr	925
vc-cos-mode	926
vci	927
vci-range	928
virtual-switch	928
vlan-id (Logical Port in Bridge Domain)	929
vlan-id (Outer VLAN ID)	929
vlan-id (VLAN ID to Be Bound to a Logical Interface)	930
vlan-id (VLAN ID to Rewrite)	931
vlan-id-list (Ethernet VLAN Circuit)	932
vlan-id-list (Interface in Bridge Domain)	934
vlan-id-range	935
vlan-ranges	936
vlan-rewrite	937
vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP)	938
vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP)	939
vlan-tagging	940
vlan-tags (Dual-Tagged Logical Interface)	941
vlan-tags (Stacked VLAN Tags)	943

	vlan-tags-outer	944
	vlan-vci-tagging	944
	vpi (ATM CCC Cell-Relay Promiscuous Mode)	945
	vpi (Define Virtual Path)	946
	vpi (Logical Interface and Interworking)	947
	vtmapping	947
	warning	948
	wavelength	949
	west-interface	953
	working-circuit	954
	yellow-differential-delay	954
	zO-increment	955
Chapter 14	Interface Operational Commands	957
	Common Output Fields Description	958
	Damping Field	958
	Destination Class Field	958
	Enabled Field	958
	Filters Field	959
	Flags Fields	959
	Addresses, Flags Field	959
	Device Flags Field	960
	Family Flags Field	960
	Interface Flags Field	961
	Link Flags Field	962
	Logical Interface Flags Field	962
	Label-Switched Interface Traffic Statistics Field	963
	Policer Field	964
	Protocol Field	964
	RPF Failures Field	965
	Source Class Field	965
	Improvements to Interface Transmit Statistics Reporting	965
	show interfaces (10-Gigabit Ethernet)	967
	show interfaces (ATM)	992
	show interfaces (Channelized DS3-to-DS0)	1027
	show interfaces (Channelized DS3-to-DS1)	1038
	show interfaces (Channelized E1 IQ)	1041
	show interfaces (Channelized E1)	1045
	show interfaces (Channelized OC12 IQ and IQE)	1056
	show interfaces (Channelized OC12)	1060
	show interfaces (Channelized OC3 IQ and IQE)	1064
	show interfaces (Channelized STM1 IQ)	1083
	show interfaces (Channelized STM1)	1086
	show interfaces (Channelized T1 IQ)	1101
	show interfaces (Channelized T3 IQ)	1113
	show interfaces (Discard)	1115
	show interfaces (Fast Ethernet)	1120
	show interfaces (Gigabit Ethernet)	1137

	show interfaces (M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet)	1161
	show interfaces (PPPoE)	1177
	show interfaces (PTX Series Packet Transport Routers)	1187
	show interfaces (SONET/SDH)	1201
	show interfaces (Serial)	1229
	show interfaces (T1, E1, or DS)	1242
	show interfaces (T3 or E3)	1267
	show interfaces demux0 (Demux Interfaces)	1284
	show interfaces extensive	1293
	show interfaces lsi (Label-Switched Interface)	1329
	show interfaces media	1332
	show interfaces terse	1335
Chapter 15	ANCP Operational Commands	1339
	clear ancp neighbor	1340
	clear ancp statistics	1342
	clear ancp subscriber	1344
	request ancp oam interface	1346
	request ancp oam neighbor	1347
	show ancp cos	1348
	show ancp neighbor	1353
	show ancp statistics	1361
	show ancp subscriber	1366
	show ancp summary	1371
	show ancp summary neighbor	1373
	show ancp summary subscriber	1375
Chapter 16	BFD Operational Commands	1377
	clear bfd adaptation	1378
	clear bfd session	1379
	show bfd session	1380
Chapter 17	BGP Operational Commands	1391
	clear bgp damping	1392
	clear bgp neighbor	1393
	clear bgp table	1396
	show bgp bmp	1398
	show bgp group	1400
	show bgp group traffic-statistics	1407
	show bgp neighbor	1409
	show bgp replication	1426
	show bgp summary	1428
	show policy damping	1434
Chapter 18	ES-IS Operational Commands	1437
	clear esis adjacency	1438
	clear esis statistics	1439
	show esis adjacency	1440
	show esis interface	1442

Chapter 19

show esis statistics	1444
IP Multicast Operational Commands	1447
clear amt statistics	1450
clear amt tunnel	1451
clear igmp membership	1452
clear igmp snooping membership	1455
clear igmp snooping statistics	1456
clear igmp statistics	1457
clear mld membership	1459
clear mld statistics	1460
clear msdp cache	1461
clear msdp statistics	1462
clear multicast bandwidth-admission	1463
clear multicast forwarding-cache	1465
clear multicast scope	1466
clear multicast sessions	1467
clear multicast snooping statistics	1468
clear multicast statistics	1469
clear pim join	1470
clear pim join-distribution	1472
clear pim register	1474
clear pim snooping join	1476
clear pim snooping statistics	1478
clear pim statistics	1480
request pim multicast-tunnel rebalance	1483
show amt statistics	1484
show amt summary	1487
show amt tunnel	1489
show dvmrp interfaces	1492
show dvmrp neighbors	1494
show dvmrp prefix	1496
show dvmrp prunes	1498
show igmp group	1500
show igmp interface	1504
show igmp snooping interface	1508
show igmp snooping membership	1513
show igmp snooping statistics	1517
show igmp statistics	1522
show mld group	1525
show mld interface	1529
show mld statistics	1533
show msdp	1536
show msdp source	1538
show msdp source-active	1540
show msdp statistics	1543
show multicast backup-pe-groups	1547
show multicast flow-map	1549
show multicast forwarding-cache statistics	1551

	show multicast interface	1553
	show multicast mrinfo	1555
	show multicast next-hops	1557
	show multicast pim-to-igmp-proxy	1560
	show multicast pim-to-mld-proxy	1562
	show multicast route	1564
	show multicast rpf	1570
	show multicast scope	1574
	show multicast snooping next-hops	1576
	show multicast sessions	1578
	show multicast snooping route	1581
	show multicast statistics	1585
	show multicast usage	1588
	show pim bootstrap	1591
	show pim interfaces	1593
	show pim join	1596
	show pim mdt	1617
	show pim mdt data-mdt-joins	1621
	show pim mdt data-mdt-limit	1623
	show pim neighbors	1625
	show pim rps	1629
	show pim snooping interfaces	1636
	show pim snooping join	1639
	show pim snooping neighbors	1643
	show pim snooping statistics	1648
	show pim source	1653
	show pim statistics	1656
	show sap listen	1666
	test msdp	1668
Chapter 20	IPv6 Operational Commands	1669
	clear ipv6 neighbors	1670
	clear ipv6 router-advertisement	1671
	show ipv6 neighbors	1672
	show ipv6 router-advertisement	1674
Chapter 21	IS-IS Operational Commands	1677
	clear isis adjacency	1678
	clear isis database	1680
	clear isis overload	1682
	clear isis statistics	1684
	show isis adjacency	1686
	show isis authentication	1690
	show isis backup coverage	1692
	show isis backup label-switched-path	1694
	show isis backup spf results	1696
	show isis context-identifier	1700
	show isis database	1702
	show isis hostname	1709
	show isis interface	1711

	show isis overview	1715
	show isis route	1719
	show isis spf	1723
	show isis statistics	1728
Chapter 22	LLDP Operational Commands	1731
	clear lldp neighbors	1732
	clear lldp statistics	1733
	show lldp	1734
	show lldp local-information	1737
	show lldp neighbors	1740
	show lldp remote-global-statistics	1746
	show lldp statistics	1748
Chapter 23	MVRP Operational Commands	1751
	show mvrp	1752
	show mvrp applicant-state	1754
	show mvrp dynamic-vlan-memberships	1756
	show mvrp interface	1757
	show mvrp registration-state	1758
	show mvrp statistics	1760
Chapter 24	OSPF Operational Commands	1763
	clear (ospf ospf3) database	1764
	clear (ospf ospf3) io-statistics	1767
	clear (ospf ospf3) neighbor	1768
	clear (ospf ospf3) overload	1770
	clear (ospf ospf3) statistics	1771
	show (ospf ospf3) backup coverage	1773
	show (ospf ospf3) backup lsp	1776
	show (ospf ospf3) backup neighbor	1778
	show (ospf ospf3) backup spf	1780
	show ospf context-identifier	1787
	show ospf database	1789
	show ospf3 database	1797
	show (ospf ospf3) interface	1808
	show (ospf ospf3) io-statistics	1814
	show (ospf ospf3) log	1816
	show (ospf ospf3) neighbor	1819
	show (ospf ospf3) overview	1825
	show (ospf ospf3) route	1830
	show (ospf ospf3) statistics	1836
Chapter 25	Protocol-Independent Routing Operational Commands	1841
	show as-path	1843
	show as-path domain	1847
	show as-path summary	1850
	show route	1852
	show route active-path	1858
	show route advertising-protocol	1863

	show route all	1868
	show route aspath-regex	1870
	show route best	1872
	show route brief	1875
	show route ccc	1877
	show route community	1878
	show route community-name	1880
	show route damping	1882
	show route detail	1887
	show route exact	1905
	show route export	1907
	show route export vrf-target	1910
	show route extensive	1912
	show route flow validation	1929
	show route forwarding-table	1931
	show route forwarding-table interface-name	1945
	show route hidden	1948
	show route inactive-path	1951
	show route inactive-prefix	1954
	show route instance	1956
	show route label	1963
	show route label-switched-path	1966
	show route localization	1968
	show route martians	1970
	show route match-prefix	1972
	show route next-hop	1973
	show route no-community	1979
	show route output	1982
	show route protocol	1987
	show route range	1997
	show route receive-protocol	2001
	show route resolution	2010
	show route snooping	2013
	show route source-gateway	2016
	show route summary	2022
	show route table	2026
	show route terse	2054
Chapter 26	RIP Operational Commands	2057
	clear rip general-statistics	2058
	clear rip statistics	2059
	show rip general-statistics	2060
	show rip neighbor	2062
	show rip statistics	2064
Chapter 27	RIPng Operational Commands	2067
	clear ripng general-statistics	2068
	clear ripng statistics	2069
	show ripng general-statistics	2070
	show ripng neighbor	2072

	show ripng statistics	2074
Chapter 28	Firewall Filter Operational Commands	2077
	clear firewall	2078
	show firewall	2080
	show firewall filter version	2088
	show firewall log	2089
	show firewall prefix-action-stats	2092
	show firewall templates-in-use	2094
	show policer	2096
Chapter 29	Layer 2 Bridging and Switching Operational Commands	2099
	clear bridge mac-table	2100
	clear error bpdu interface	2101
	clear error mac-rewrite	2102
	show bridge domain	2103
	show bridge flood	2105
	show bridge mac-table	2112
	show bridge statistics	2117
	show l2-learning global-information	2120
	show l2-learning global-mac-count	2122
	show l2-learning instance	2123
	show l2-learning interface	2125
	show mac-rewrite interface	2127
Chapter 30	VPN Operational Commands	2129
	clear vpls mac-address	2130
	clear vpls mac-table	2131
	request l2circuit-switchover	2132
	show dynamic-tunnels database	2133
	show hfrf profiles	2136
	show ingress-replication mvpn	2138
	show l2circuit connections	2140
	show l2vpn connections	2148
	show mvpn c-multicast	2154
	show mvpn instance	2157
	show mvpn neighbor	2160
	show vpls connections	2164
	show vpls flood event-queue	2176
	show vpls flood instance	2178
	show vpls flood route	2180
	show vpls mac-table	2182
	show vpls statistics	2187
Part 6	Index	
	Index	2193

List of Figures

Part 1	Router Interfaces	
Chapter 1	Router Interfaces Overview	3
	Figure 1: APS Interface	8
	Figure 2: Container Interface	9
	Figure 3: Routing Matrix	35
	Figure 4: Routing Matrix Based on a TX Matrix Plus Router	37
	Figure 5: Interface Slot, PIC, and Port Locations	40
Chapter 2	Configuring Physical Interface Properties	57
	Figure 6: Two Router Interfaces Connected Through Transport Equipment	139
	Figure 7: Multiple Flaps of Short Duration (Milliseconds)	140
	Figure 8: Periodic Flaps of Long Duration (Seconds)	141
	Figure 9: Physical-Level Link Is Down When the Penalty Falls Below the Reuse Level	143
	Figure 10: Physical-Level Link Is Up When the Penalty Falls Below the Reuse Level	144
Chapter 4	Configuring Protocol Family and Interface Address Properties	183
	Figure 11: Hierarchical Policer	207
	Figure 12: Unicast RPF with Routing Asymmetry	219
	Figure 13: Unicast RPF Sample Topoolgy	228
	Figure 14: Prefix Accounting with Source and Destination Classes	236
	Figure 15: Prefix Accounting with Source and Destination Classes	238
Chapter 5	Configuring Circuit and Translational Cross-Connects	247
	Figure 16: Layer 2 Switching Circuit Cross-Connect	248
	Figure 17: Example Topology of a Switching Circuit Cross-Connect with Frame Relay CCC Encapsulation	258
	Figure 18: Layer 2.5 Switching Translational Cross-Connect	259
	Figure 19: Interface-to-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces	260
	Figure 20: Remote Interface-LSP-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces	262
	Figure 21: ATM-to-Ethernet Interworking	264
Part 3	Serial Interfaces	
Chapter 10	Configuring Serial Interfaces	295
	Figure 22: Serial Interface Clocking Mode	300
	Figure 23: Serial Interface LIU Loopback	306
	Figure 24: Serial Interface Local Loopback	306

List of Tables

	About the Documentation	xli
	Table 1: Notice Icons	xliii
	Table 2: Text and Syntax Conventions	xliv
Part 1	Router Interfaces	
Chapter 1	Router Interfaces Overview	3
	Table 3: M7i Routing Engines	15
	Table 4: M10i Routing Engines	16
	Table 5: M40e Routing Engines	16
	Table 6: M120 Routing Engines	16
	Table 7: M320 Routing Engines	17
	Table 8: MX5, MX10, MX40, and MX80 Routing Engine	18
	Table 9: MX104 Routing Engines	18
	Table 10: MX240 Supported Routing Engines	18
	Table 11: MX480 Supported Routing Engines	19
	Table 12: MX960 Supported Routing Engines	20
	Table 13: MX2010 Supported Routing Engines	21
	Table 14: MX2020 Supported Routing Engines	22
	Table 15: PTX3000 Routing Engines	22
	Table 16: PTX5000 Routing Engines	23
	Table 17: T320 Routing Engines	23
	Table 18: T640 Routing Engines	23
	Table 19: T1600 Routing Engines	24
	Table 20: T4000 Routing Engines	25
	Table 21: TX Matrix Routing Engines	26
	Table 22: TX Matrix Plus Routing Engines	26
	Table 23: Routing Engines on TX Matrix Plus with 3D SIBs	26
	Table 24: FPC Numbering for T640 Routers in a Routing Matrix	36
	Table 25: One-to-One FPC Numbering for T640 Routers in a Routing Matrix	36
	Table 26: FPC Numbering for T1600 Routers in a Routing Matrix	38
	Table 27: One-to-One FPC Numbering for T1600 Routers in a Routing Matrix	38
	Table 28: Encapsulation Support by Interface Type	41
Chapter 2	Configuring Physical Interface Properties	57
	Table 29: Statements for Physical Interface Properties	68
	Table 30: Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers	95
	Table 31: Media MTU Sizes by Interface Type for M40e Routers	96
	Table 32: Media MTU Sizes by Interface Type for M160 Routers	97

	Table 33: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers	97
	Table 34: Media MTU Sizes by Interface Type for MX Series Routers	98
	Table 35: Media MTU Sizes by Interface Type for T320 Routers	99
	Table 36: Media MTU Sizes by Interface Type for T640 Platforms	99
	Table 37: Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers	100
	Table 38: Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers	100
	Table 39: Encapsulation Overhead by Encapsulation Type	101
	Table 40: Effect of set interfaces disable <interface_name> on T series PICs	155
Chapter 3	Configuring Logical Interface Properties	157
	Table 41: Statements for Logical Interface Properties	161
Chapter 4	Configuring Protocol Family and Interface Address Properties	183
	Table 42: Protocol Family Configuration Tasks	186
Part 3	Serial Interfaces	
Chapter 10	Configuring Serial Interfaces	295
	Table 43: Signal Handling by Serial Interface Type	302
Part 4	Monitoring and Troubleshooting Interfaces	
Chapter 12	Troubleshooting Interfaces	317
	Table 44: Loopback Modes by Interface Type	318
	Table 45: BERT Capabilities by Interface Type	321
Part 5	Configuration Statements and Operational Commands	
Chapter 14	Interface Operational Commands	957
	Table 46: show interfaces Gigabit Ethernet Output Fields	968
	Table 47: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type	982
	Table 48: ATM show interfaces Output Fields	992
	Table 49: Channelized DS3 show interfaces Output Fields	1027
	Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields	1045
	Table 51: Channelized OC show interfaces Output Fields	1065
	Table 52: Channelized STM1 show interfaces Output Fields	1086
	Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields	1101
	Table 54: Discard show interfaces Output Fields	1115
	Table 55: show interfaces Fast Ethernet Output Fields	1120
	Table 56: show interfaces (Gigabit Ethernet) Output Fields	1138
	Table 57: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type	1152
	Table 58: show interfaces Output Fields for M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface	1162
	Table 59: show interfaces (PPPoE) Output Fields	1177
	Table 60: show interfaces PTX Series Output Fields	1188

	Table 61: SONET/SDH show interfaces Output Fields	1202
	Table 62: show interfaces (Serial) Output Fields	1229
	Table 63: T1 or E1 show interfaces Output Fields	1243
	Table 64: T3 or E3 show interfaces Output Fields	1267
	Table 65: show interfaces demux0 (Demux Interfaces) Output Fields	1284
	Table 66: Logical Tunnel show interfaces Output Fields	1329
	Table 67: show interfaces terse Output Fields	1335
Chapter 15	ANCP Operational Commands	1339
	Table 68: show ancp cos Output Fields	1348
	Table 69: show ancp neighbor Output Fields	1353
	Table 70: show ancp statistics Output Fields	1361
	Table 71: show ancp subscriber Output Fields	1366
	Table 72: show ancp summary Output Fields	1371
	Table 73: show ancp summary neighbor Output Fields	1373
	Table 74: show ancp summary subscriber Output Fields	1375
Chapter 16	BFD Operational Commands	1377
	Table 75: show bfd session Output Fields	1381
Chapter 17	BGP Operational Commands	1391
	Table 76: show bgp bmp Output Fields	1398
	Table 77: show bgp group Output Fields	1401
	Table 78: show bgp group traffic-statistics Output Fields	1407
	Table 79: show bgp neighbor Output Fields	1410
	Table 80: show bgp replication Output Fields	1426
	Table 81: show bgp summary Output Fields	1429
	Table 82: show policy damping Output Fields	1434
Chapter 18	ES-IS Operational Commands	1437
	Table 83: show esis adjacency Output Fields	1440
	Table 84: show esis interface Output Fields	1442
	Table 85: show esis statistics Output Fields	1444
Chapter 19	IP Multicast Operational Commands	1447
	Table 86: show amt statistics Output Fields	1484
	Table 87: show amt summary Output Fields	1487
	Table 88: show amt tunnel Output Fields	1489
	Table 89: show dvmrp interfaces Output Fields	1492
	Table 90: show dvmrp neighbors Output Fields	1494
	Table 91: show dvmrp prefix Output Fields	1496
	Table 92: show dvmrp prunes Output Fields	1498
	Table 93: show igmp group Output Fields	1500
	Table 94: show igmp interface Output Fields	1504
	Table 95: show igmp snooping interface Output Fields	1508
	Table 96: show igmp snooping membership Output Fields	1513
	Table 97: show igmp snooping statistics Output Fields	1517
	Table 98: show igmp statistics Output Fields	1522
	Table 99: show mld group Output Fields	1525
	Table 100: show mld interface Output Fields	1529
	Table 101: show mld statistics Output Fields	1533

	Table 102: show msdp Output Fields	1536
	Table 103: show msdp source Output Fields	1539
	Table 104: show msdp source-active Output Fields	1541
	Table 105: show msdp statistics Output Fields	1543
	Table 106: show multicast backup-pe-groups Output Fields	1547
	Table 107: show multicast flow-map Output Fields	1549
	Table 108: show multicast forwarding-cache statistics Output Fields	1551
	Table 109: show multicast interface Output Fields	1553
	Table 110: show multicast minfo Output Fields	1555
	Table 111: show multicast next-hops Output Fields	1558
	Table 112: show multicast pim-to-igmp-proxy Output Fields	1560
	Table 113: show multicast pim-to-mld-proxy Output Fields	1562
	Table 114: show multicast route Output Fields	1565
	Table 115: show multicast rpf Output Fields	1571
	Table 116: show multicast scope Output Fields	1574
	Table 117: show multicast snooping next-hops Output Fields	1576
	Table 118: show multicast sessions Output Fields	1578
	Table 119: show multicast snooping route Output Fields	1582
	Table 120: show multicast statistics Output Fields	1585
	Table 121: show multicast usage Output Fields	1589
	Table 122: show pim bootstrap Output Fields	1591
	Table 123: show pim interfaces Output Fields	1593
	Table 124: show pim join Output Fields	1598
	Table 125: show pim mdt Output Fields	1617
	Table 126: show pim mdt data-mdt-joins Output Fields	1621
	Table 127: show pim mdt data-mdt-limit Output Fields	1623
	Table 128: show pim neighbors Output Fields	1626
	Table 129: show pim rps Output Fields	1630
	Table 130: show pim snooping interface Output Fields	1636
	Table 131: show pim snooping join Output Fields	1639
	Table 132: show pim snooping neighbors Output Fields	1644
	Table 133: show pim snooping statistics Output Fields	1648
	Table 134: show pim source Output Fields	1654
	Table 135: show pim statistics Output Fields	1657
	Table 136: show sap listen Output Fields	1666
Chapter 20	IPv6 Operational Commands	1669
	Table 137: show ipv6 neighbors Output Fields	1672
	Table 138: show ipv6 router-advertisement Output Fields	1674
Chapter 21	IS-IS Operational Commands	1677
	Table 139: show isis adjacency Output Fields	1687
	Table 140: show isis authentication Output Fields	1690
	Table 141: show isis backup coverage Output Fields	1692
	Table 142: show isis backup label-switched-path Output Fields	1694
	Table 143: show isis backup spf results Output Fields	1697
	Table 144: show isis context-identifier Output Fields	1700
	Table 145: show isis database Output Fields	1703
	Table 146: show isis hostname Output Fields	1709
	Table 147: show isis interface Output Fields	1712

	Table 148: show isis overview Output Fields	1715
	Table 149: show isis route Output Fields	1720
	Table 150: show isis spf Output Fields	1723
	Table 151: show isis statistics Output Fields	1729
Chapter 22	LLDP Operational Commands	1731
	Table 152: show lldp Output Fields	1734
	Table 153: show lldp local-information Output Fields	1737
	Table 154: show lldp neighbors Output Fields	1740
	Table 155: show lldp remote-global-statistics Output Fields	1746
	Table 156: show lldp statistics Output Fields	1748
Chapter 23	MVRP Operational Commands	1751
	Table 157: show mvrp Output Fields	1752
	Table 158: show mvrp applicant-state Output Fields	1754
	Table 159: show mvrp dynamic-vlan-memberships Output Fields	1756
	Table 160: show mvrp interface Output Fields	1757
	Table 161: show mvrp registration-state Output Fields	1758
	Table 162: show mvrp statistics Output Fields	1760
Chapter 24	OSPF Operational Commands	1763
	Table 163: show (ospf ospf3) backup coverage Output Fields	1773
	Table 164: show (ospf ospf3) backup lsp Output Fields	1776
	Table 165: show (ospf ospf3) backup neighbor Output Fields	1778
	Table 166: show (ospf ospf3) backup spf Output Fields	1781
	Table 167: show ospf context-identifier Output Fields	1788
	Table 168: show ospf database Output Fields	1790
	Table 169: show ospf3 database Output Fields	1798
	Table 170: show (ospf ospf3) interface Output Fields	1809
	Table 171: show (ospf ospf3) io-statistics Output Fields	1814
	Table 172: show (ospf ospf3) log Output Fields	1816
	Table 173: show (ospf ospf3) neighbor Output Fields	1820
	Table 174: show ospf overview Output Fields	1826
	Table 175: show (ospf ospf3) route Output Fields	1831
	Table 176: show (ospf ospf3) statistics Output Fields	1836
Chapter 25	Protocol-Independent Routing Operational Commands	1841
	Table 177: show as-path Output Fields	1844
	Table 178: show as-path domain Output Fields	1847
	Table 179: show as-path summary Output Fields	1850
	Table 180: show route Output Fields	1853
	Table 181: show route advertising-protocol Output Fields	1863
	Table 182: show route damping Output Fields	1883
	Table 183: show route detail Output Fields	1887
	Table 184: Next-Hop Types Output Field Values	1892
	Table 185: State Output Field Values	1894
	Table 186: Communities Output Field Values	1896
	Table 187: show route export Output Fields	1907
	Table 188: show route export vrf-target Output Fields	1910
	Table 189: show route extensive Output Fields	1912

	Table 190: show route flow validation Output Fields	1929
	Table 191: show route forwarding-table Output Fields	1934
	Table 192: show route forwarding-table interface-name Output Fields	1945
	Table 193: show route instance Output Fields	1957
	Table 194: show route localization Output Fields	1968
	Table 195: show route martians Output Fields	1970
	Table 196: show route receive-protocol Output Fields	2002
	Table 197: show route resolution Output Fields	2011
	Table 198: show route summary Output Fields	2022
	Table 199: show route table Output Fields	2027
	Table 200: Next-hop Types Output Field Values	2032
	Table 201: State Output Field Values	2034
	Table 202: Communities Output Field Values	2036
	Table 203: show route terse Output Fields	2054
Chapter 26	RIP Operational Commands	2057
	Table 204: show rip general-statistics Output Fields	2060
	Table 205: show rip neighbor Output Fields	2063
	Table 206: show rip statistics Output Fields	2065
Chapter 27	RIPng Operational Commands	2067
	Table 207: show ripng general-statistics Output Fields	2070
	Table 208: show ripng neighbor Output Fields	2072
	Table 209: show ripng statistics Output Fields	2074
Chapter 28	Firewall Filter Operational Commands	2077
	Table 210: show firewall Output Fields	2081
	Table 211: show firewall filter version Output Fields	2088
	Table 212: show firewall log Output Fields	2089
	Table 213: show firewall prefix-action-stats Output Fields	2093
	Table 214: show firewall templates-in-use Output Fields	2094
	Table 215: show policer Output Fields	2096
Chapter 29	Layer 2 Bridging and Switching Operational Commands	2099
	Table 216: show bridge mac-table Output Fields	2113
	Table 217: show l2-learning global-information Output Fields	2120
	Table 218: show l2-learning instance Output Fields	2123
	Table 219: show l2-learning interface Output Fields	2125
	Table 220: show mac-rewrite interface Output Fields	2127
Chapter 30	VPN Operational Commands	2129
	Table 221: show dynamic-tunnels database Output Fields	2133
	Table 222: show hfrr profiles Output Fields	2136
	Table 223: show ingress-replication mvpn Output Fields	2138
	Table 224: show l2circuit connections Output Fields	2141
	Table 225: show l2vpn connections Output Fields	2149
	Table 226: show mvpn c-multicast Output Fields	2154
	Table 227: show mvpn instance Output Fields	2157
	Table 228: show mvpn neighbor Output Fields	2160
	Table 229: show vpls connections Output Fields	2165
	Table 230: show vpls flood event-queue Output Fields	2176

Table 231: show vpls flood instance Output Fields	2178
Table 232: show vpls flood route Output Fields	2180
Table 233: show vpls mac-table Output fields	2183
Table 234: show vpls statistics Output Fields	2187

About the Documentation

- [Documentation and Release Notes on page xli](#)
- [Supported Platforms on page xli](#)
- [Using the Examples in This Manual on page xli](#)
- [Documentation Conventions on page xliii](#)
- [Documentation Feedback on page xlv](#)
- [Requesting Technical Support on page xlv](#)

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

Supported Platforms

For the features described in this document, the following platforms are supported:

- [ACX Series](#)
- [M Series](#)
- [MX Series](#)
- [T Series](#)
- [PTX Series](#)

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming

configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xsl;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the *CLI User Guide*.

Documentation Conventions

Table 1 on page [xlili](#) defines notice icons used in this guide.

Table 1: Notice Icons







Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page [xliv](#) defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies guide names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS CLI User Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level. The console port is labeled CONSOLE.
< > (angle brackets)	Encloses optional keywords or variables.	stub <default-metric metric>;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast (string1 string2 string3)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Encloses a variable for which you can substitute one or more values.	community name members [community-ids]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

GUI Conventions

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> In the Logical Interfaces box, select All Interfaces. To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select Protocols>Ospf .

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <http://www.juniper.net/techpubs/feedback/>.
- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes:
<http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Router Interfaces

- [Router Interfaces Overview on page 3](#)
- [Configuring Physical Interface Properties on page 57](#)
- [Configuring Logical Interface Properties on page 157](#)
- [Configuring Protocol Family and Interface Address Properties on page 183](#)
- [Configuring Circuit and Translational Cross-Connects on page 247](#)

CHAPTER 1

Router Interfaces Overview

- [Router Interfaces Overview on page 4](#)
- [Types of Interfaces Overview on page 4](#)
- [Understanding Permanent Interfaces on page 5](#)
- [Understanding Transient Interfaces on page 5](#)
- [Understanding Services Interfaces on page 7](#)
- [Understanding Container Interfaces on page 8](#)
- [Understanding Management Ethernet Interfaces on page 10](#)
- [TX Matrix Plus and T1600 Router \(Routing Matrix\) Management Ethernet Interfaces on page 11](#)
- [Understanding Internal Ethernet Interfaces on page 12](#)
- [T1600 Routers \(Routing Matrix\) Internal Ethernet Interfaces on page 14](#)
- [Supported Routing Engines by Router on page 14](#)
- [Interface Naming Overview on page 27](#)
- [Interface Encapsulations Overview on page 41](#)
- [Interface Descriptors Overview on page 52](#)
- [Physical Part of an Interface Name on page 53](#)
- [Displaying Interface Configurations Overview on page 55](#)

Router Interfaces Overview

Routers typically contain several different types of interfaces suited to various functions. For the interfaces on a router to function, you must configure them. Specify the interface location (that is, the slot where the Flexible PIC Concentrator [FPC], Dense Port Concentrator [DPC], or Modular Port Concentrator [MPC] is installed. You must also specify the location of the Physical Interface Card [PIC] or Modular Interface Card [MIC], and the interface type, for example, SONET/SDH, Asynchronous Transfer Mode [ATM], or Ethernet). Finally, you must specify the encapsulation type and any interface-specific properties that may apply.

You can configure interfaces that are currently present in the router, as well as interfaces that are not currently present but that are expected to be added in the future. Junos OS detects the interface once the hardware has been installed and applies the pre-set configuration to it.

To see which interfaces are currently installed in the router, issue the **show interfaces terse** operational mode command. If an interface is listed in the output, it is physically installed in the router. If an interface is not listed in the output, it is not installed in the router.

For information about which interfaces are supported on your router, see your router's *Interface Module Reference*.

You can configure Junos OS class-of-service (CoS) properties to provide a variety of classes of service for different applications, including multiple forwarding classes for managing packet transmission, congestion management, and CoS-based forwarding. For more information about configuring CoS properties, see the *Class of Service Feature Guide for Routing Devices*.

Related Documentation

- *Interfaces Fundamentals for Routing Devices*

Types of Interfaces Overview

Interfaces can be permanent or transient, and are used for networking or services:

- Permanent interfaces—Interfaces that are always present in the router.
- Transient interfaces—Interfaces that can be inserted into or removed from the router depending on your network configuration needs.
- Networking interfaces—Interfaces, such as Ethernet or SONET/SDH interfaces, that primarily provide traffic connectivity.
- Services interfaces—Interfaces that provide specific capabilities for manipulating traffic before it is delivered to its destination.
- Container interfaces—Interfaces that support automatic protection switching (APS) on physical SONET links using a virtual container infrastructure.

Junos OS internally generates nonconfigurable interfaces which are described in *Interfaces Command Reference* and *Services Interfaces*.

**Related
Documentation**

- [Understanding Permanent Interfaces on page 5](#)
- [Understanding Transient Interfaces on page 5](#)
- [Understanding Services Interfaces on page 7](#) and *Junos OS Services Interfaces Library for Routing Devices*
- [Understanding Container Interfaces on page 8](#)
- See also the following sections regarding specific networking interface technologies used in your routers:
 - *ATM Interfaces Overview*
 - *Channelized Interfaces Overview*
 - *Circuit Emulation Interfaces: Understanding Mobile Backhaul*
 - *E1 Interfaces Overview* and *E3 Interfaces Overview*
 - *Ethernet Interfaces Overview*
 - *Frame Relay Overview*
 - *SONET/SDH Interfaces Overview*
 - *T1 Interfaces Overview* and *T3 Interfaces Overview*

Understanding Permanent Interfaces

Permanent interfaces in the router consist of management Ethernet interfaces and internal Ethernet interfaces, which are described separately in the following topics:

- [Understanding Management Ethernet Interfaces on page 10](#)
- [Understanding Internal Ethernet Interfaces on page 12](#)

Understanding Transient Interfaces

The M Series, MX Series, and T Series routers contain slots for installing Flexible PIC Concentrator [FPC] or Dense Port Concentrator [DPC] (for MX Series routers) or Modular Port Concentrator [MPC] (for MX Series routers). Physical Interface Card [PIC] can be installed in FPCs. Modular Interface Card [MIC] can be inserted into MPCs.

The number of PICs that can be installed varies by router and type of FPC. The PICs provide the actual physical interfaces to the network. The MX Series routers contain slots for installing either DPC boards that provide the physical interfaces to the network or for installing FPCs in which PICs can be installed.

You can insert any DPC or FPC into any slot that supports them in the appropriate router. Typically, you can place any combination of PICs, compatible with your router, in any location on an FPC. (You are limited by the total FPC bandwidth, and by the fact that

some PICs physically require two or four of the PIC locations on the FPC. In some cases, power limitations or microcode limitations may also apply.) To determine DPC and PIC compatibility, see the see your router's *Interface Module Reference*.

You can insert MPC into any slot that supports them in the appropriate router. You can install up to two MICs of different media types in the same MPC as long as the MPC supports those MICs.

These physical interfaces are transient interfaces of the router. They are referred to as transient because you can hot-swap a DPC or FPC or MPC and its PICs or MICs at any time.

You must configure each transient interface based on the slot in which the FPC or DPC or MPC is installed, the location in which the PIC or MIC is installed, and for multiple port PICs or MICs, the port to which you are connecting.

You can configure the interfaces on PICs or MICs that are already installed in the router as well as interfaces on PICs or MICs that you plan to install later. The Junos OS detects which interfaces are actually present, so when the software activates its configuration, it activates only the present interfaces and retains the configuration information for the interfaces that are not present. When the Junos OS detects that an FPC containing PICs or MPC containing MICs has been inserted into the router, the software activates the configuration for those interfaces.

**Related
Documentation**

- [Types of Interfaces Overview on page 4](#)
- [Understanding Permanent Interfaces on page 5](#)
- [Understanding Management Ethernet Interfaces on page 10](#)
- [Understanding Internal Ethernet Interfaces on page 12](#)
- [Supported Routing Engines by Router on page 14](#)
- [Understanding Services Interfaces on page 7](#)
- [Understanding Container Interfaces on page 8](#)
- [Interface Encapsulations Overview on page 41](#)
- [Interface Descriptors Overview on page 52](#)
- [Interface Naming Overview on page 27](#)
- [Displaying Interface Configurations Overview on page 55](#)

Understanding Services Interfaces

Services interfaces enable you to incrementally add services to your network. The Junos OS supports the following services PICs:

- **Adaptive Services (AS) PICs**—Allow you to provide multiple services on a single PIC by configuring a set of services and applications. The AS PICs offer a special range of services you configure in one or more service sets.
- **ES PIC**—Provides a security suite for the IP version 4 (IPv4) and IP version 6 (IPv6) network layers. The suite provides functionality such as authentication of origin, data integrity, confidentiality, replay protection, and nonrepudiation of source. It also defines mechanisms for key generation and exchange, management of security associations, and support for digital certificates.
- **Monitoring Services PICs**—Enable you to monitor traffic flow and export the monitored traffic. Monitoring traffic allows you to gather and export detailed information about IPv4 traffic flows between source and destination nodes in your network; sample all incoming IPv4 traffic on the monitoring interface and present the data in cflowd record format; perform discard accounting on an incoming traffic flow; encrypt or tunnel outgoing cflowd records, intercepted IPv4 traffic, or both; and direct filtered traffic to different packet analyzers and present the data in its original format. On a Monitoring Services II PIC, you can configure either monitoring interfaces or collector interfaces. A collector interface allows you to combine multiple cflowd records into a compressed ASCII data file and export the file to an FTP server.
- **Multilink Services, MultiServices, Link Services, and Voice Services PICs**—Enable you to split, recombine, and sequence datagrams across multiple logical data links. The goal of multilink operation is to coordinate multiple independent links between a fixed pair of systems, providing a virtual link with greater bandwidth than any of the members.
- **Tunnel Services PIC**—By encapsulating arbitrary packets inside a transport protocol, tunneling provides a private, secure path through an otherwise public network. Tunnels connect discontinuous subnetworks and enable encryption interfaces, virtual private networks (VPNs), and Multiprotocol Label Switching (MPLS).
- On M Series and T Series routers, logical tunnel interfaces allow you to connect logical systems, virtual routers, or VPN instances. For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*. For more information about configuring tunnels, see the *Junos OS Services Interfaces Library for Routing Devices*.

Related Documentation

- [Types of Interfaces Overview on page 4](#)

Understanding Container Interfaces

Container interfaces provide the following features:

- Automatic protection switching (APS) on SONET/SDH and ATM links are supported using the container infrastructure.
- Container physical interfaces and logical interfaces remain up on switchover.
- APS parameters are auto-copied from the container interface to the member links.



NOTE: Paired groups and true unidirectional APS are not currently supported.

For more information on SONET/SDH configuration, see *Configuring Container Interfaces for APS on SONET Links*.

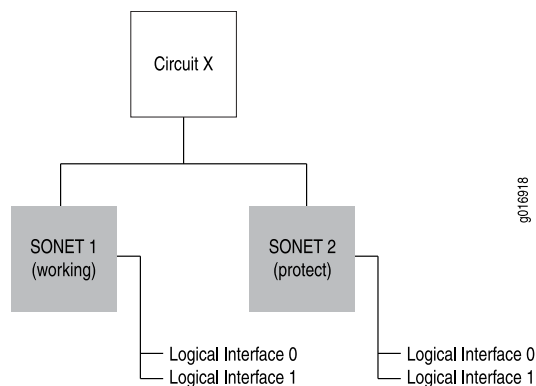
Container interfaces features are described in the following sections:

- [Understanding Traditional APS Concept on page 8](#)
- [Container Interfaces Concept on page 9](#)
- [APS Support for Container-Based Interfaces on page 9](#)
- [Autocopy of APS Parameters on page 9](#)

Understanding Traditional APS Concept

Traditional APS is configured on two independent physical SONET/SDH interfaces: one configured as the working circuit and the other as the protect circuit (see [Figure 1 on page 8](#)). The circuit, named Circuit X in the figure, is the link between the two SONET interfaces.

Figure 1: APS Interface



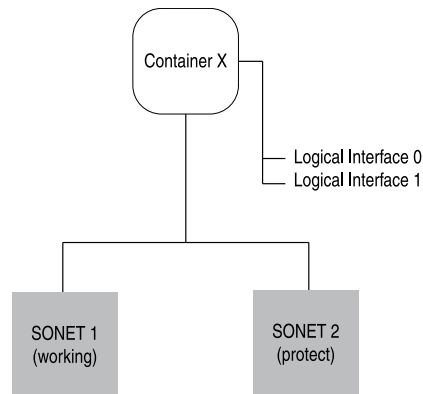
Traditional APS uses routing protocols that run on each individual SONET/SDH interface (since circuit is an abstract construct, instead of being an actual interface). When the working link goes down, the APS infrastructure brings up the protect link and its underlying logical interfaces, and brings down the working link and its underlying logical interfaces,

causing the routing protocols to reconverge. This consumes time and leads to traffic loss even though the APS infrastructure has performed the switch quickly.

Container Interfaces Concept

To solve this problem, the Junos OS provides a soft interface construct called a container interface (see [Figure 2 on page 9](#)).

Figure 2: Container Interface



The container interface allows routing protocols to run on the logical interfaces associated with a virtual *container interface* instead of on the physical SONET/SDH and ATM interfaces. When APS switches the underlying physical link based on a fault condition, the container interface remains up, and the logical interface on the container interface does not flap. The routing protocols remain unaware of the APS switching.

APS Support for Container-Based Interfaces

With the container interface, APS is configured on the container interface itself. Individual member SONET/SDH and ATM links are either marked as primary (corresponding to the working circuit) or standby (corresponding to the protect circuit) in the configuration. No circuit or group name is specified in the container interface model; physical SONET/SDH and ATM links are put in an APS group by linking them to a single container interface. APS parameters are specified at the container interface level, and are propagated to the individual SONET/SDH and ATM links by the APS daemon.

Autocopy of APS Parameters

Typical applications require copying APS parameters from the working circuit to the protect circuit, since most of the parameters must be the same for both circuits. This is automatically done in the container interface. APS parameters are specified only once under the container physical interface configuration, and are internally copied over to the individual physical SONET/SDH and ATM links.

- Related Documentation**
- *Configuring Container Interfaces for APS on SONET Links*
 - *Displaying APS Using a Container Interface with ATM Encapsulation*

Understanding Management Ethernet Interfaces

Management interfaces are the primary interfaces for accessing the device remotely. Typically, a management interface is not connected to the in-band network, but is connected instead to the device's internal network. Through a management interface you can access the device over the network using utilities such as **ssh** and **telnet** and configure the device from anywhere, regardless of its physical location. SNMP can use the management interface to gather statistics from the device.

A management interface lets authorized users and management systems connect to the device over the network. Some Juniper Networks devices have a dedicated management port on the front panel. For other types of platforms, you can configure a management interface on one of the network interfaces. This interface can be dedicated to management or shared with other traffic. Before users can access the management interface, you must configure it. Information required to set up the management interface includes its IP address and prefix. In many types of Junos OS devices (or recommended configurations), it is not possible to route traffic between the management interface and the other ports. Therefore, you should select an IP address in a separate (logical) network, with a separate prefix (netmask).

For devices with dedicated management ports, Junos OS automatically configures the router's management Ethernet interface, as either **em0** or **fxp0**. You can use the **show interfaces terse | match fxp0** or **show interfaces terse | match em0** command to display management interface information.

To use the management Ethernet interface as a management port, you must configure its logical port, **em0.0** or **fxp0.0**, with a valid IP address.

For some SRX Series Services Gateways, you can use any of the built-in Ethernet ports as a management interface. To use a built-in interface as a management Ethernet interface, configure it with a valid IP address. To manually configure J-Web access, include the **interface *interface-name*** statement at the **[edit system services web-management http]** hierarchy level.

For PTX Series Packet Transport Routers, the Junos OS automatically creates the router's management Ethernet interface, **em0**. To use **em0** as an out-of-band management port, you must configure its logical port (for example, **em0.0**) with a valid IP address.

Internal Ethernet interfaces are automatically created to connect the Routing Engines to the Packet Forwarding Engines in the FPCs.

When you enter the **show interfaces** command on a PTX Series Packet Transport Router, the management Ethernet interface and internal Ethernet interfaces (and logical interfaces) are displayed:

```
user@host> show interfaces ?
...
em0
  em0.0
  ixgbe0
  ixgbe0.0
  ixgbe1
```

```
ixgbe1.0
...
```



NOTE: *Routing Engine upgrade considerations*—When upgrading to a Routing Engine that supports em0 from a Routing Engine that supports fxp0, you must convert existing management Ethernet interface references in the router configuration files from fxp0, fxp1, or fxp2 interfaces to em0 interfaces. Whether you use an automated script or edit the configuration files manually, you must revise any command lines that reference the fxp0 management Ethernet interface by replacing “fxp0” with “em0.”

Reusing scripts for standalone T1600 routers on T1600 routers in a routing matrix—Automated scripts that you have developed for standalone T1600 routers (T1600 routers that are not in a routing matrix) might contain references to the fxp0 management Ethernet interface. Before reusing the scripts on T1600 routers in a routing matrix, edit the command lines that reference the fxp0 management Ethernet interface so that the commands reference the em0 management Ethernet interface instead.

Restricted load-sharing next hops with fxp0—On M Series Multiservices Edge Routers and T Series Core Routers running Junos OS later than Release 7.0R2.7 or Release 7.1R2.2, the fxp0 interface does not support load-sharing next hops. This restriction only affects fxp0 routes.

CoS not supported on fxp0—The fxp0 interface does not support class of service (CoS).

The Routing Engines in the PTX Series Packet Transport Routers do not support the management Ethernet interface fxp0, or the internal Ethernet interfaces fxp1 or fxp2.

Related Documentation

- [Supported Routing Engines by Router on page 14](#)

TX Matrix Plus and T1600 Router (Routing Matrix) Management Ethernet Interfaces

For TX Matrix Plus Routers and for T1600 Core Routers with RE-C1800 configured in a routing matrix, the Junos OS automatically creates the router’s management Ethernet interface, **em0**. To use **em0** as a management port, you must configure its logical port, **em0.0**, with a valid IP address.

When you enter the **show interfaces** command on a TX Matrix Plus router, the management Ethernet interfaces (and logical interfaces) are displayed:

```
user@host> show interfaces ?
...
em0
em0.0
...
```



NOTE: The Routing Engines in the TX Matrix Plus router and in the T1600 routers with RE-C1800 configured in a routing matrix do not support the management Ethernet interface `fxp0`, or the internal Ethernet interfaces `fxp1` or `fxp2`.

**Related
Documentation**

- [Understanding Internal Ethernet Interfaces on page 12](#)
- [T1600 Routers \(Routing Matrix\) Internal Ethernet Interfaces on page 14](#)
- [Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router](#)
- [show interfaces \(M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet\) on page 1161](#)

Understanding Internal Ethernet Interfaces

Within a router or packet transport router, internal Ethernet interfaces provide communication between the Routing Engine and the Packet Forwarding Engines. The Junos OS automatically configures internal Ethernet interfaces when the Junos OS boots. The Junos OS boots the packet-forwarding component hardware. When these components are running, the Control Board uses the internal Ethernet interface to transmit hardware status information to the Routing Engine. Information transmitted includes the internal router temperature, the condition of the fans, whether an FPC has been removed or inserted, and information from the LCD on the craft interface.

To determine the supported internal Ethernet interfaces for your router, see [“Supported Routing Engines by Router” on page 14](#).



NOTE: Do not modify or remove the configuration for the internal Ethernet interface that the Junos OS automatically configures. If you do, the router or packet transport router will stop functioning.

- M Series, and MX Series routers and T Series routers—The Junos OS creates the internal Ethernet interface. The internal Ethernet interface connects the Routing Engine `re0` to the Packet Forwarding Engines.

If the router has redundant Routing Engines, another internal Ethernet interface is created on each Routing Engine (`re0` and `re1`) in order to support fault tolerance, two physical links between `re0` and `re1` connect the independent control planes. If one of the links fails, both Routing Engines can use the other link for IP communication.

- TX Matrix Plus routers—On a TX Matrix Plus router, the Routing Engine and Control Board function as a unit, or host subsystem. For each host subsystem in the router, the Junos OS automatically creates two internal Ethernet interfaces, `ixgbe0` and `ixgbe1`.

The `ixgbe0` and `ixgbe1` interfaces connect the TX Matrix Plus Routing Engine to the Routing Engines of every line-card chassis (LCC) configured in the routing matrix.

The TX Matrix Plus Routing Engine connects to a high-speed switch through a 10-Gbps link within the host subsystem. The switch provides a 1-Gbps link to each T1600 Routing Engine. The 1-Gbps links are provided through the UTP Category 5 Ethernet cable connections between the TXP-CBs and the LCC-CBs in the LCCs.

- The TX Matrix Plus Routing Engine connects to a high-speed switch in the local Control Board through a 10-Gbps link within the host subsystem.
- The Gigabit Ethernet switch connects the Control Board to the remote Routing Engines of every LCC configured in the routing matrix.

If a TX Matrix Plus router contains redundant host subsystems, the independent control planes are connected by two physical links between the two 10-Gigabit Ethernet ports on their respective Routing Engines.

- The primary link to the remote Routing Engine is at the `ixgbe0` interface; the 10-Gigabit Ethernet switch on the local Control Board also connects the Routing Engine to the 10-Gigabit Ethernet port accessed by the `ixgbe1` interface on the remote Routing Engine.
- The alternate link to the remote Routing Engine is the 10-Gigabit Ethernet port at the `ixgbe1` interface. This second port connects the Routing Engine to the 10-Gigabit Ethernet switch on the remote Control Board, which connects to the 10-Gigabit Ethernet port at the `ixgbe0` interface on the remote Routing Engine.

If one of the two links between the host subsystems fails, both Routing Engines can use the other link for IP communication.

- LCC in a routing matrix—On an LCC configured in a routing matrix, the Routing Engine and Control Board function as a unit, or host subsystem. For each host subsystem in the LCC, the Junos OS automatically creates two internal Ethernet interfaces, `bcm0` and `em1`, for the two Gigabit Ethernet ports on the Routing Engine.

The `bcm0` interface connects the Routing Engine in each LCC to the Routing Engines of every other LCC configured in the routing matrix.

- The Routing Engine connects to a Gigabit Ethernet switch on the local Control Board through a.
- The switch connects the Control Board to the remote Routing Engines of every other LCC configured in the routing matrix.

If an LCC in a routing matrix contains redundant host subsystems, the independent control planes are connected by two physical links between the Gigabit Ethernet ports on their respective Routing Engines.

- The primary link to the remote Routing Engine is at the `bcm0` interface; the Gigabit Ethernet switch on the local Control Board also connects the Routing Engine to the Gigabit Ethernet port accessed by the `em1` interface on the remote Routing Engine.

- The alternate link to the remote Routing Engine is at the **em1** interface. This second port connects the Routing Engine to the Gigabit Ethernet switch on the remote Control Board, which connects to the Gigabit Ethernet port at the **bcm0** interface on the remote Routing Engine.

If one of the two links between the host subsystems fails, both Routing Engines can use the other link for IP communication.

Each router also has two serial ports, labeled *console* and *auxiliary*, for connecting tty type terminals to the router using standard PC-type tty cables. Although these ports are not network interfaces, they do provide access to the router.

**Related
Documentation**

- [Understanding Permanent Interfaces on page 5](#)
- [Supported Routing Engines by Router on page 14](#)
- [TX Matrix Plus and T1600 Router \(Routing Matrix\) Management Ethernet Interfaces on page 11](#)
- [T1600 Routers \(Routing Matrix\) Internal Ethernet Interfaces on page 14](#)
- [Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router](#)
- [show interfaces \(M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet\) on page 1161](#)

T1600 Routers (Routing Matrix) Internal Ethernet Interfaces

On a T1600 router configured in a routing matrix, the Routing Engine (RE-TXP-LCC) and Control Board (LCC-CB) function as a unit, or host subsystem. For each host subsystem in the router, the Junos OS automatically creates two internal Ethernet interfaces, **bcm0** and **em1**, for the two Gigabit Ethernet ports on the Routing Engine.

**Related
Documentation**

- [Understanding Internal Ethernet Interfaces on page 12](#)
- [Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router](#)
- [show interfaces \(M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet\) on page 1161](#)

Supported Routing Engines by Router

The following tables list the Routing Engines that each router supports, the first supported release for the Routing Engine in the specified router, the management Ethernet interface, and the internal Ethernet interfaces for each Routing Engine.

- [M7i Routing Engines on page 15](#)
- [M10i Routing Engines on page 15](#)
- [M40e Routing Engines on page 16](#)
- [M120 Routing Engines on page 16](#)
- [M320 Routing Engines on page 17](#)

- [MX5, MX10, MX40, and MX80 Routing Engine on page 17](#)
- [MX104 Routing Engines on page 18](#)
- [MX240 Routing Engines on page 18](#)
- [MX480 Routing Engines on page 19](#)
- [MX960 Routing Engines on page 20](#)
- [MX2010 Routing Engines on page 21](#)
- [MX2020 Supported Routing Engines on page 22](#)
- [PTX3000 Routing Engines on page 22](#)
- [PTX5000 Routing Engines on page 22](#)
- [T320 Routing Engines on page 23](#)
- [T640 Routing Engines on page 23](#)
- [T1600 Routing Engines on page 24](#)
- [T4000 Routing Engines on page 25](#)
- [TX Matrix Routing Engines on page 25](#)
- [TX Matrix Plus Routing Engines on page 26](#)
- [TX Matrix Plus \(with 3D SIBs\) Routing Engines on page 26](#)

M7i Routing Engines

[Table 3 on page 15](#) lists the Routing Engines supported by the M7i router. The M7i router supports 32-bit Junos OS only.

Table 3: M7i Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-400-768 (EOL details: TSB16445)	RE-5.0	9.0	fxp0	fxp1
RE-850-1536 (EOL details: TSB15553)	RE-850	7.2	fxp0	fxp1
RE-B-1800X1-4G	RE-B-1800x1	11.4R4 12.1R2	fxp0	em0

M10i Routing Engines

[Table 4 on page 16](#) lists the Routing Engines supported by the M10i router. The M10i router supports 32-bit Junos OS only.

Table 4: M10i Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-400-768 (EOL details: TSB16445)	RE-5.0	9.0	fxp0	fxp1 fxp2
RE-850-1536 (EOL details: TSB15553)	RE-850	7.2	fxp0	fxp1 fxp2
RE-B-1800X1-4G	RE-B-1800x1	11.4R4 12.1R2	fxp0	em0

M40e Routing Engines

[Table 5 on page 16](#) lists the Routing Engines supported by the M40e router.

Table 5: M40e Routing Engines

Model Number	Name in CLI Output	First Supported Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-600-2048 (EOL details: TSB14373)	RE-3.0 or RE-3.0 (RE-600)	5.3	fxp0	fxp1 fxp2
RE-A-1000-2048	RE-A-1000	8.1	fxp0	fxp1 fxp2

M120 Routing Engines

[Table 6 on page 16](#) lists the Routing Engines supported by the M120 router.

Table 6: M120 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-A-1000-2048	RE-A-1000	8.0R2	–	fxp0	fxp1 fxp2
RE-A-2000-4096	RE-A-2000	8.0R2	–	fxp0	em0 bcm0

Table 6: M120 Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-A-1800X2-8G	RE-A-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	fxp1 fxp2
RE-A-1800X2-16G	RE-A-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	fxp1 fxp2
RE-A-1800X4-16G	RE-A-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1

M320 Routing Engines

Table 7 on page 17 lists the Routing Engines supported by the M320 router.

Table 7: M320 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-1600-2048 (EOL details: TSB14374)	RE-4.0	6.2	–	fxp0	fxp1 fxp2
RE-A-2000-4096	RE-A-2000	8.1	–	fxp0	em0 bcm0
RE-A-1800X2-8G	RE-A-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 bcm0
RE-A-1800X2-16G	RE-A-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 bcm0
RE-A-1800X4-8G	RE-A-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 12.2 	10.4	fxp0	em0 em1

MX5, MX10, MX40, and MX80 Routing Engine

Table 8 on page 18 lists the Routing Engines supported by the MX5, MX10, MX40, and MX80 routers.

Table 8: MX5, MX10, MX40, and MX80 Routing Engine

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
Built-in Routing Engine	Routing Engine RE-MX80	12.3	–	fxp0	em0 em1 <small>NOTE: em1 is used to communicate with the MS-MIC when it is inserted.</small>

MX104 Routing Engines

Table 9 on page 18 lists the Routing Engines supported by MX104 routers.

Table 9: MX104 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-MX104	Routing Engine	13.2	–	fxp0	fxp1 fxp2

MX240 Routing Engines

Table 10 on page 18 lists the Routing Engines supported by MX240 routers.



NOTE: Subscriber management is not supported when the routing protocol daemon (rpd) is running in 64-bit mode. For subscriber management support, rpd must run in 32-bit mode.

Table 10: MX240 Supported Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1300-2048 (EOL details: TSB16556)	RE-S-1300	9.0	–	fxp0	fxp1 fxp2
RE-S-2000-4096 (EOL details: TSB16735)	RE-S-2000	9.0	–	fxp0	fxp1 fxp2
RE-S-1800X2-8G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1

Table 10: MX240 Supported Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1800x2-16G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-8G	RE-S-1800X4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-16G	RE-S-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-32G-S	RE-S-1800X4	<ul style="list-style-type: none"> 12.3R4 13.2R1 	<ul style="list-style-type: none"> 12.3R4 13.2R1 	fxp0	em0, em1
RE-S-X6-64G	RE-S-2X00x6	—	15.1F4	fxp0	ixlv0, igb0

MX480 Routing Engines

Table 11 on page 19 lists the Routing Engines supported by MX480 routers.



NOTE: Subscriber management is not supported when the routing protocol daemon (rpd) is running in 64-bit mode. For subscriber management support, rpd must run in 32-bit mode.

Table 11: MX480 Supported Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1300-2048 (EOL details: TSB16556)	RE-S-1300	8.4	—	fxp0	fxp1 fxp2
RE-S-2000-4096 (EOL details: TSB16735)	RE-S-2000	8.4	—	fxp0	fxp1 fxp2
RE-S-1800X2-8G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1

Table 11: MX480 Supported Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1800X2-16G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-8G	RE-S-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-16G	RE-S-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-32G-S	RE-S-1800x4	<ul style="list-style-type: none"> 12.3R4 13.2R1 	<ul style="list-style-type: none"> 12.3R4 13.2R1 	fxp0	em0 em1
RE-S-X6-64G	RE-S-2X00x6	—	15.1F4	fxp0	ixlv0, igb0

MX960 Routing Engines

Table 12 on page 20 lists the Routing Engines supported by MX960 routers.



NOTE: Subscriber management is not supported when the routing protocol daemon (rpd) is running in 64-bit mode. For subscriber management support, rpd must run in 32-bit mode.

Table 12: MX960 Supported Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1300-2048 (EOL details: TSB16556)	RE-S-1300	8.2	—	fxp0	fxp1 fxp2
RE-S-2000-4096 (EOL details: TSB16735)	RE-S-2000	8.2	—	fxp0	fxp1 fxp2
RE-S-1800X2-8G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1

Table 12: MX960 Supported Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-S-1800X2-16G (EOL details: TSB16556)	RE-S-1800x2	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-8G	RE-S-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-16G	RE-S-1800x4	<ul style="list-style-type: none"> 11.4R5 12.1R3 	10.4	fxp0	em0 em1
RE-S-1800X4-32G-S	RE-S-1800x4	<ul style="list-style-type: none"> 12.3R4 13.2R1 	<ul style="list-style-type: none"> 12.3R4 13.2R1 	fxp0	em0 em1
RE-S-X6-64G	RE-S-2X00x6	—	15.1F4	fxp0	ixlv0, igb0

MX2010 Routing Engines

Table 13 on page 21 lists the Routing Engines supported by MX2010 routers.



NOTE: Subscriber management is not supported when the routing protocol daemon (rpd) is running in 64-bit mode. For subscriber management support, rpd must run in 32-bit mode.

Table 13: MX2010 Supported Routing Engines

Model Number	Name in CLI Output	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-MX2000-1800X4	RE-S-1800x4	12.3R2	fxp0	em0 em1
REMX2K-1800-32G-S	RE-S-1800x4	<ul style="list-style-type: none"> 12.3R4 13.2R1 	fxp0	em0 em1
REMX2K-X8-64G	RE-S-2X00x8	<ul style="list-style-type: none"> 15.1F5 16.1R2 	fxp0	em0 em1

MX2020 Supported Routing Engines

Table 14 on page 22 lists the Routing Engines supported by MX2020 routers.



NOTE: Subscriber management is not supported when the routing protocol daemon (rpd) is running in 64-bit mode. For subscriber management support, rpd must run in 32-bit mode.

Table 14: MX2020 Supported Routing Engines

Model Number	Name in CLI Output	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-MX2000-1800X4	RE-S-1800x4	12.3R2	fxp0	em0 em1
REMX2K-1800-32G-S	RE-S-1800x4	<ul style="list-style-type: none"> 12.3R4 13.2R1 	fxp0	em0 em1
REMX2K-X8-64G	RE-S-2X00x8	<ul style="list-style-type: none"> 15.1F5 16.1R2 	fxp0	em0 em1

PTX3000 Routing Engines

Table 15 on page 22 lists the Routing Engines supported on the PTX3000.



NOTE: The PTX3000 supports 64-bit Junos OS only.

Table 15: PTX3000 Routing Engines

Model Number	Name in CLI Output	First Supported Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C2600-16G	RE-DUO-2600	13.2R2	em0	ixgbe0 ixgbe1

PTX5000 Routing Engines

Table 16 on page 23 lists the Routing Engines supported on the PTX5000.



NOTE: The PTX5000 supports 64-bit Junos OS only.

Table 16: PTX5000 Routing Engines

Model Number	Name in CLI Output	First Supported Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C2600-16G	RE-DUO-2600	12.1X48	em0	ixgbe0
		12.3		ixgbe1
		13.2		
		NOTE: The PTX5000 does not support Junos OS Releases 12.1, 12.2, or 13.1.		
RE-PTX-X8-64G	RE-PTX-2X00x8	15.1F4	em0	ixlv0, ixlv1

T320 Routing Engines

Table 17 on page 23 lists the Routing Engines supported by the T320 router.

Table 17: T320 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-600-2048 (EOL details: TSB14373)	RE-3.0 or RE-3.0 (RE-600)	5.3	fxp0	fxp1
				fxp2
RE-1600-2048 (EOL details: TSB14374)	RE-4.0	6.2	fxp0	fxp1
				fxp2
RE-A-2000-4096	RE-A-2000	8.1	fxp0	fxp1
				fxp2

T640 Routing Engines

Table 18 on page 23 lists the Routing Engines supported by the T640 router.

Table 18: T640 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-600-2048 (EOL details: TSB14373)	RE-3.0 or RE-3.0 (RE-600)	5.3	—	fxp0	fxp1
					fxp2

Table 18: T640 Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-1600-2048 (EOL details: TSB14374)	RE-4.0	6.2	—	fxp0	fxp1 fxp2
RE-A-2000-4096	RE-A-2000	8.1	—	fxp0	em0 bcm0
RE-DUO-C1800-8G	RE-DUO-1800	32-bit Junos OS on a standalone T640 router: 11.2 32-bit Junos OS on a T640 router in a routing matrix: 11.4R9	64-bit Junos OS on a standalone T640 router: 11.3 64-bit Junos OS on a T640 router in a routing matrix: 11.4R9	em0	bcm0 em1
RE-DUO-C1800-16G	RE-DUO-1800	32-bit Junos OS on a standalone T640 router: 11.4R2 32-bit Junos OS on a T640 router in a routing matrix: 11.4R9	64-bit Junos OS on a standalone T640 router: 11.4R2 64-bit Junos OS on a T640 router in a routing matrix: 11.4R9	em0	bcm0 em1

T1600 Routing Engines

Table 19 on page 24 lists the Routing Engines supported by the T1600 router.



NOTE: (Two RE-DUO-C1800-8G or two RE-DUO-C1800-16G are required to connect to a Routing Matrix)

Table 19: T1600 Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-600-2048 (EOL details: TSB14373)	RE-3.0 or RE-3.0 (RE-600)	8.5	—	fxp0	fxp1 fxp2
RE-1600-2048 (EOL details: TSB14374)	RE-4.0 (RE-1600)	8.5	—	fxp0	fxp1 fxp2
RE-A-2000-4096	RE-A-2000	8.5	—	fxp0	em0 bcm0

Table 19: T1600 Routing Engines (*continued*)

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C1800-8G	RE-TXP-LCC or RE-DUO-1800	32-bit Junos OS on a T1600 router in a routing matrix: 9.6 <i>NOTE:</i> Junos OS Releases 9.6 through 10.4 support RE-DUO-C1800-8G only during upgrade to a line-card chassis (LCC) in a routing matrix. 32-bit Junos OS on a standalone T1600 router: 11.1	64-bit Junos OS on a T1600 router in a routing matrix: 9.6 64-bit Junos OS on a standalone T1600 router: 11.1	em0	bcm0 em1
RE-DUO-C1800-16G	RE-DUO-1800	32-bit Junos OS on a standalone T1600 router: 11.4R2 32-bit Junos OS on a T1600 router in a routing matrix: 11.4R2	64-bit Junos OS on a standalone T1600 router: 11.4R2 64-bit Junos OS on a T1600 router in a routing matrix: 11.4R2	em0	bcm0 em1

T4000 Routing Engines

Table 20 on page 25 lists the Routing Engines supported by the T4000 router.



NOTE: The T4000 router supports 64-bit Junos OS only.

Table 20: T4000 Routing Engines

Model Number	Name in CLI Output	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C1800-8G	RE-DUO-1800	Standalone T4000 router: 12.1 T4000 router in a routing matrix: 13.1	em0	bcm0 em1
RE-DUO-C1800-16G	RE-DUO-1800	Standalone T4000 router: 12.1R2 T4000 router in a routing matrix: 13.1	em0	bcm0 em1

TX Matrix Routing Engines

Table 21 on page 26 lists the Routing Engines supported by the TX Matrix router.

Table 21: TX Matrix Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-600-2048 (EOL details: TSB14373)	RE-3.0 or RE-3.0 (RE-600)	7.0	–	fxp0	fxp1 fxp2
RE-1600-2048 (EOL details: TSB14374)	RE-4.0 (RE-1600)	7.0	–	fxp0	fxp1 fxp2
RE-A-2000-4096	RE-A-2000	8.5	–	fxp0	em0 bcm0
RE-DUO-C1800-8G	RE-DUO-1800	11.4R9	11.4R9	em0	bcm0 em1
RE-DUO-C1800-16G	RE-DUO-1800	11.4R9	11.4R9	em0	bcm0 em1

TX Matrix Plus Routing Engines

Table 22 on page 26 lists the Routing Engines supported by the TX Matrix Plus router.

Table 22: TX Matrix Plus Routing Engines

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C2600-16G	RE-TXP-SFC or RE-DUO-2600	32-bit Junos OS: 9.6	64-bit Junos OS: 11.4	em0	ixgbe0 ixgbe1

TX Matrix Plus (with 3D SIBs) Routing Engines

Table 23 on page 26 lists the Routing Engines supported by the TX Matrix Plus router with 3D SIBs.

Table 23: Routing Engines on TX Matrix Plus with 3D SIBs

Model Number	Name in CLI Output	First Supported 32-bit Junos OS Release	First Supported 64-bit Junos OS Release	Management Ethernet Interface	Internal Ethernet Interface
RE-DUO-C2600-16G	RE-TXP-SFC or RE-DUO-2600	–	64-bit Junos OS: 11.4	em0	ixgbe0 ixgbe1

- Related Documentation**
- [Routing Engine Specifications](#)
 - [Understanding Internal Ethernet Interfaces on page 12](#)
 - [Understanding Management Ethernet Interfaces on page 10](#)

Interface Naming Overview

Each interface has an interface name, which specifies the media type, the slot in which the FPC or DPC is located, the location on the FPC where the PIC is installed, and the PIC or DPC port. The interface name uniquely identifies an individual network connector in the system. You use the interface name when configuring interfaces and when enabling various functions and properties, such as routing protocols, on individual interfaces. The system uses the interface name when displaying information about the interface, for example, in the **show interfaces** command.

The interface name is represented by a physical part, a channel part, and a logical part in the following format:

`physical[:channel].logical`

The channel part of the name is optional for all interfaces except channelized DS3, E1, OC12, and STM1 interfaces.

The following sections provide interface naming configuration guidelines:

- [Physical Part of an Interface Name on page 27](#)
- [Logical Part of an Interface Name on page 33](#)
- [Separators in an Interface Name on page 33](#)
- [Channel Part of an Interface Name on page 33](#)
- [Interface Naming for a Routing Matrix Based on a TX Matrix Router on page 34](#)
- [Interface Naming for a Routing Matrix Based on a TX Matrix Plus Router on page 36](#)
- [Chassis Interface Naming on page 39](#)
- [Examples: Interface Naming on page 39](#)

Physical Part of an Interface Name

The physical part of an interface name identifies the physical device, which corresponds to a single physical network connector.

**NOTE:**

The internal interface is dependent on the Routing Engine. To identify if the Routing Engine is using this type of interface, use the following command:

```
user@host> show interfaces terse
Interface           Admin Link Proto  Local          Remote
pfe-1/0/0           up    up
pfe-1/0/0.16383     up    up    inet
                   inet6
pfh-1/0/0           up    up
pfh-1/0/0.16383     up    up    inet
[.....]
bcm0                up    up <-----
bcm0.0              up    up    inet 10.0.0.1/8
[.....]
lsi                 up    up
mtun                up    up
pimd                up    up
ptime              up    up
tap                 up    up
```

For more information on the Routing Engines that each chassis supports, the first supported release for the Routing Engine in the specified chassis, the management Ethernet interface, and the internal Ethernet interfaces for each Routing Engine, please refer the link titled *Supported Routing Engines by Chassis* under Related Documentation section.

This part of the interface name has the following format:

type-fpc/pic/port

type is the media type, which identifies the network device that can be one of the following:

- **ae**—Aggregated Ethernet interface. This is a virtual aggregated link and has a different naming format from most PICs; for more information, see *Aggregated Ethernet Interfaces Overview*.
- **as**—Aggregated SONET/SDH interface. This is a virtual aggregated link and has a different naming format from most PICs; for more information, see *Configuring Aggregated SONET/SDH Interfaces*.
- **at**—ATM1 or ATM2 intelligent queuing (IQ) interface or a virtual ATM interface on a circuit emulation (CE) interface.
- **bcm**—The bcm0 internal Ethernet process is supported on specific Routing engines for various M series and T series routers. For more information please refer the link titled *Supported Routing Engines by Chassis* under Related Documentation section.
- **br**—Integrated Services Digital Network (ISDN) interface (configured on a 1-port or 4-port ISDN Basic Rate Interface (BRI) card). This interface has a different naming format from most PICs: **br-pim/0/port**. The second number is always 0. For more information, see *Configuring ISDN Physical Interface Properties*.

- **cau4**—Channelized AU-4 IQ interface (configured on the Channelized STM1 IQ or IQE PIC or Channelized OC12 IQ and IQE PICs).
- **ce1**—Channelized E1 IQ interface (configured on the Channelized E1 IQ PIC or Channelized STM1 IQ or IQE PIC).
- **ci**—Container interface.
- **coc1**—Channelized OC1 IQ interface (configured on the Channelized OC12 IQ and IQE or Channelized OC3 IQ and IQE PICs).
- **coc3**—Channelized OC3 IQ interface (configured on the Channelized OC3 IQ and IQE PICs).
- **coc12**—Channelized OC12 IQ interface (configured on the Channelized OC12 IQ and IQE PICs).
- **coc48**—Channelized OC48 interface (configured on the Channelized OC48 and Channelized OC48 IQE PICs).
- **cp**—Collector interface (configured on the Monitoring Services II PIC).
- **cstm1**—Channelized STM1 IQ interface (configured on the Channelized STM1 IQ or IQE PIC).
- **cstm4**—Channelized STM4 IQ interface (configured on the Channelized OC12 IQ and IQE PICs).
- **cstm16**—Channelized STM16 IQ interface (configured on the Channelized OC48/STM16 and Channelized OC48/STM16 IQE PICs).
- **ct1**—Channelized T1 IQ interface (configured on the Channelized DS3 IQ and IQE PICs, Channelized OC3 IQ and IQE PICs, Channelized OC12 IQ and IQE PICs, or Channelized T1 IQ PIC).
- **ct3**—Channelized T3 IQ interface (configured on the Channelized DS3 IQ and IQE PICs, Channelized OC3 IQ and IQE PICs, or Channelized OC12 IQ and IQE PICs).
- **demux**—Interface that supports logical IP interfaces that use the IP source or destination address to demultiplex received packets. Only one demux interface (**demux0**) exists per chassis. All demux logical interfaces must be associated with an underlying logical interface.
- **dfc**—Interface that supports dynamic flow capture processing on T Series or M320 routers containing one or more Monitoring Services III PICs. Dynamic flow capture enables you to capture packet flows on the basis of dynamic filtering criteria. Specifically, you can use this feature to forward passively monitored packet flows that match a particular filter list to one or more destinations using an on-demand control protocol.
- **ds**—DS0 interface (configured on the Multichannel DS3 PIC, Channelized E1 PIC, Channelized OC3 IQ and IQE PICs, Channelized OC12 IQ and IQE PICs, Channelized DS3 IQ and IQE PICs, Channelized E1 IQ PIC, Channelized STM1 IQ or IQE PIC, or Channelized T1 IQ).
- **dsc**—Discard interface.

- **e1**—E1 interface (including channelized STM1-to-E1 interfaces).
- **e3**—E3 interface (including E3 IQ interfaces).
- **em**—Management and internal Ethernet interfaces. For M Series routers, MX Series routers, T Series routers, and TX Series routers, you can use the **show chassis hardware** command to display hardware information about the router, including its Routing Engine model. To determine which management interface is supported on your router and Routing Engine combination, see [“Understanding Management Ethernet Interfaces” on page 10](#) and [“Supported Routing Engines by Router” on page 14](#).
- **es**—Encryption interface.
- **et**—100-Gigabit Ethernet interfaces (10, 40, and 100-Gigabit Ethernet interface for PTX Series Packet Transport Routers only).
- **fe**—Fast Ethernet interface.
- **fxp**—Management and internal Ethernet interfaces. For M Series routers, MX Series routers, T Series routers, and TX Series routers, you can use the **show chassis hardware** command to display hardware information about the router, including its Routing Engine model. To determine which management interface is supported on your router and Routing Engine combination, see [“Understanding Management Ethernet Interfaces” on page 10](#) and [“Supported Routing Engines by Router” on page 14](#).
- **ge**—Gigabit Ethernet interface. Some older 10-Gigabit Ethernet interfaces use the **ge** media type to identify the physical part of the network device, but newer 10-Gigabit Ethernet interfaces use the **xe** media type.



NOTE: For configuration, the **ge** interface name should be used instead of the **xe** interface name in XENPAK 10-Gigabit Ethernet interface PICs. Refer the following show commands for more information:

```
user@host> show chassis hardware
..
FPC 4          REV 02   710-015839   CZ1853          M120 FPC Type
3
  PIC 0          REV 09   750-009567   NH1857          1x
10GE(LAN), XENPAK
  Xcvr 0         REV 01   740-012045   535TFZX6        XENPAK-SR

user@host> show configuration interfaces ge-4/0/0
unit 0 {
  family inet {
    address 100.0.0.1/24;
  }
}
```

- **gr**—Generic routing encapsulation (GRE) tunnel interface.
- **gre**—Internally generated interface that is configurable only as the control channel for Generalized MPLS (GMPLS). For more information about GMPLS, see the *Junos OS MPLS Applications Library for Routing Devices* and the *Junos OS, Release 15.1*.



NOTE: You can configure GRE interfaces (`gre-x/y/z`) only for GMPLS control channels. GRE interfaces are not supported or configurable for other applications..

- **ip**—IP-over-IP encapsulation tunnel interface.
- **ipip**—Internally generated interface that is not configurable.
- **ixgbe**—The internal Ethernet process `ixgbe0` and `ixgbe1` are used by the RE-DUO-C2600-16G Routing Engine, which is supported on TX Matrix Plus and PTX5000.
- **iw**—Logical interfaces associated with the endpoints of Layer 2 circuit and Layer 2 VPN connections (pseudowire stitching Layer 2 VPNs). For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*.
- **lc**—Internally generated interface that is not configurable.
- **lo**—Loopback interface. The Junos OS automatically configures one loopback interface (`lo0`). The logical interface **lo0.16383** is a nonconfigurable interface for router control traffic.
- **ls**—Link services interface.
- **lsi**—Internally generated interface that is not configurable.
- **ml**—Multilink interface (including Multilink Frame Relay and MLPPP).
- **mo**—Monitoring services interface (including monitoring services and monitoring services II). The logical interface **mo-fpc/pic/port.16383** is an internally generated, nonconfigurable interface for router control traffic.
- **ms**—Multiservices interface.
- **mt**—Multicast tunnel interface (internal router interface for VPNs). If your router has a Tunnel PIC, the Junos OS automatically configures one multicast tunnel interface (**mt**) for each virtual private network (VPN) you configure. Although it is not necessary to configure multicast interfaces, you can use the **multicast-only** statement to configure the unit and family so that the tunnel can transmit and receive multicast traffic only. For more information, see [multicast-only](#).
- **mtun**—Internally generated interface that is not configurable.
- **oc3**—OC3 IQ interface (configured on the Channelized OC12 IQ and IQE PICs or Channelized OC3 IQ and IQE PICs).
- **pd**—Interface on the rendezvous point (RP) that de-encapsulates packets.
- **pe**—Interface on the first-hop PIM router that encapsulates packets destined for the RP router.
- **pimd**—Internally generated interface that is not configurable.
- **pime**—Internally generated interface that is not configurable.

- **rlsq**—Container interface, numbered from 0 through 127, used to tie the primary and secondary LSQ PICs together in high availability configurations. Any failure of the primary PIC results in a switch to the secondary PIC and vice versa.
- **rms**—Redundant interface for two multiservices interfaces.
- **rsp**—Redundant virtual interface for the adaptive services interface.
- **se**—Serial interface (including EIA-530, V.35, and X.21 interfaces).
- **si**—Services-inline interface, which is hosted on a Trio-based line card.
- **so**—SONET/SDH interface.
- **sp**—Adaptive services interface. The logical interface **sp-fpc/pic/port.16383** is an internally generated, nonconfigurable interface for router control traffic.
- **stm1**—STM1 interface (configured on the OC3/STM1 interfaces).
- **stm4**—STM4 interface (configured on the OC12/STM4 interfaces).
- **stm16**—STM16 interface (configured on the OC48/STM16 interfaces).
- **t1**—T1 interface (including channelized DS3-to-DS1 interfaces).
- **t3**—T3 interface (including channelized OC12-to-DS3 interfaces).
- **tap**—Internally generated interface that is not configurable.
- **umd**—USB modem interface.
- **vsp**—Voice services interface.
- **vc4**—Virtually concatenated interface.
- **vt**—Virtual loopback tunnel interface.
- **xe**—10-Gigabit Ethernet interface. Some older 10-Gigabit Ethernet interfaces use the **ge** media type (rather than **xe**) to identify the physical part of the network device.
- **xt**—Logical interface for Protected System Domains to establish a Layer 2 tunnel connection.

fpc identifies the number of the FPC or DPC card on which the physical interface is located. Specifically, it is the number of the slot in which the card is installed.

M40, M40e, M160, M320, M120, T320, T640, and T1600 routers each have eight FPC slots that are numbered 0 through 7, from left to right as you are facing the front of the chassis. For information about compatible FPCs and PICs, see the hardware guide for your router.

On PTX1000 routers, the FPC number is always 0.

The M20 router has four FPC slots that are numbered 0 through 3, from top to bottom as you are facing the front of the chassis. The slot number is printed adjacent to each slot.

MX Series routers support DPCs, FPCs, and Modular Interface Cards (MICs). For information about compatible DPCs, FPCs, PICs, and MICs, see the [MX Series Interface Module Reference](#).

For M5, M7i, M10, and M10i routers, the FPCs are built into the chassis; you install the PICs into the chassis.

The M5 and M7i routers have space for up to four PICs. The M7i router also comes with an integrated Tunnel PIC, or an optional integrated AS PIC, or an optional integrated MS PIC.

The M10 and M10i routers have space for up to eight PICs.

A routing matrix can have up to 32 FPCs (numbered 0 through 31).

For more information about interface naming for a routing matrix, see “[Interface Naming for a Routing Matrix Based on a TX Matrix Router](#)” on page 34.

pic identifies the number of the PIC on which the physical interface is located. Specifically, it is the number of the PIC location on the FPC. FPCs with four PIC slots are numbered 0 through 3. FPCs with three PIC slots are numbered 0 through 2. The PIC location is printed on the FPC carrier board. For PICs that occupy more than one PIC slot, the lower PIC slot number identifies the PIC location.

port identifies a specific port on a PIC or DPC. The number of ports varies depending on the PIC. The port numbers are printed on the PIC.

Logical Part of an Interface Name

The logical unit part of the interface name corresponds to the logical unit number, which can be a number from 0 through 16,385 for all interface types except demux and PPPoE. For these two interface types only, the range is 0 through 65,535.

In the virtual part of the name, a period (.) separates the port and logical unit numbers:

- Other platforms:

type-fpc/pic/port.logical

Separators in an Interface Name

There is a separator between each element of an interface name.

In the physical part of the name, a hyphen (-) separates the media type from the FPC number, and a slash (/) separates the FPC, PIC, and port numbers.

In the virtual part of the name, a period (.) separates the channel and logical unit numbers.

A colon (:) separates the physical and virtual parts of the interface name.

Channel Part of an Interface Name

The channel identifier part of the interface name is required only on channelized interfaces. For channelized interfaces, channel 0 identifies the first channelized interface. For

channelized IQ and channelized IQE interfaces, channel 1 identifies the first channelized interface. A nonconcatenated (that is, channelized) SONET/SDH OC48 interface has four OC12 channels, numbered 0 through 3.

To determine which types of channelized PICs are currently installed in the router, use the **show chassis hardware** command from the top level of the command-line interface (CLI). Channelized IQ and IQE PICs are listed in the output with “intelligent queuing IQ” or “enhanced intelligent queuing IQE” in the description. For more information, see *Channelized Interfaces Overview*.

For ISDN interfaces, you specify the B-channel in the form **bc-pim/0/port:n**. *n* is the B-channel ID and can be 1 or 2. You specify the D-channel in the form **dc-pim/0/port:0**.



NOTE: For ISDN, the B-channel and D-channel interfaces do not have any configurable parameters. However, when interface statistics are displayed, B-channel and D-channel interfaces have statistical values.



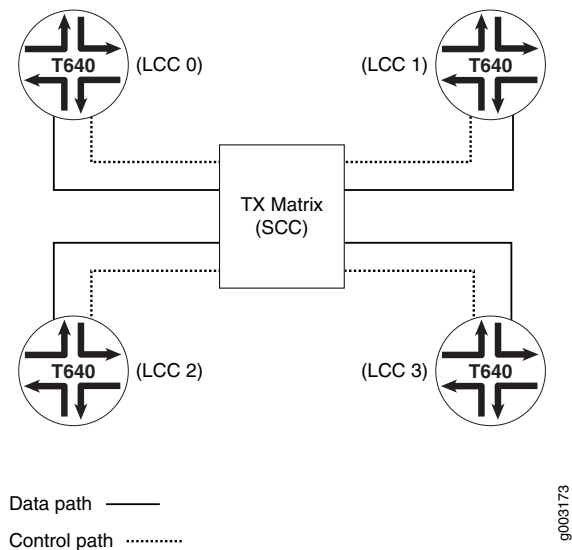
NOTE: In the Junos OS implementation, the term *logical interfaces* generally refers to interfaces you configure by including the unit statement at the [edit interfaces *interface-name*] hierarchy level. Logical interfaces have the *.logical* descriptor at the end of the interface name, as in ge-0/0/0.1 or t1-0/0/0.0.1, where the logical unit number is 1.

Although channelized interfaces are generally thought of as logical or virtual, the Junos OS sees T3, T1, and NxDS0 interfaces within a channelized IQ or IQE PIC as physical interfaces. For example, both t3-0/0/0 and t3-0/0/0.1 are treated as physical interfaces by the Junos OS. In contrast, t3-0/0/0.2 and t3-0/0/0.1.2 are considered logical interfaces because they have the .2 at the end of the interface names.

Interface Naming for a Routing Matrix Based on a TX Matrix Router

A routing matrix based on a Juniper Networks TX Matrix router is a multichassis architecture composed of one TX Matrix router and from one to four interconnected T640 routers. From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix router controls all the T640 routers, as shown in [Figure 3 on page 35](#).

Figure 3: Routing Matrix



A TX Matrix router is also referred to as a *switch-card chassis* (SCC). The CLI uses **scc** to refer to the TX Matrix router. A T640 router in a routing matrix is also referred to as a *line-card chassis* (LCC). The CLI uses **lcc** as a prefix to refer to a specific T640 router.

LCCs are assigned numbers 0 through 3, depending on the hardware setup and connectivity to the TX Matrix router. For more information, see the [TX Matrix Router Hardware Guide](#). A routing matrix can have up to four T640 routers, and each T640 router has up to eight FPCs. Therefore, the routing matrix as a whole can have up to 32 FPCs (0 through 31).

In the Junos OS CLI, an interface name has the following format:

type-fpc/pic/port

When you specify the **fpc** number for a T640 router in a routing matrix, the Junos OS determines which T640 router contains the specified FPC based on the following assignment:

- On LCC 0, FPC hardware slots 0 through 7 are configured as 0 through 7.
- On LCC 1, FPC hardware slots 0 through 7 are configured as 8 through 15.
- On LCC 2, FPC hardware slots 0 through 7 are configured as 16 through 23.
- On LCC 3, FPC hardware slots 0 through 7 are configured as 24 through 31.

For example, the 1 in **se-1/0/0** refers to FPC hardware slot 1 on the T640 router labeled **lcc0**. The 11 in **t1-11/2/0** refers to FPC hardware slot 3 on the T640 router labeled **lcc1**. The 20 in **so-20/0/1** refers to FPC hardware slot 4 on the T640 router labeled **lcc2**. The 31 in **t3-31/1/0** refers to FPC hardware slot 7 on the T640 router labeled **lcc3**.

[Table 24 on page 36](#) summarizes the FPC numbering for a T640 router in a routing matrix.

Table 24: FPC Numbering for T640 Routers in a Routing Matrix

LCC Numbers Assigned to the T640 Router	Configuration Numbers
0	0 through 7
1	8 through 15
2	16 through 23
3	24 through 31

Table 25 on page 36 lists each FPC hardware slot and the corresponding configuration numbers for LCCs 0 through 3.

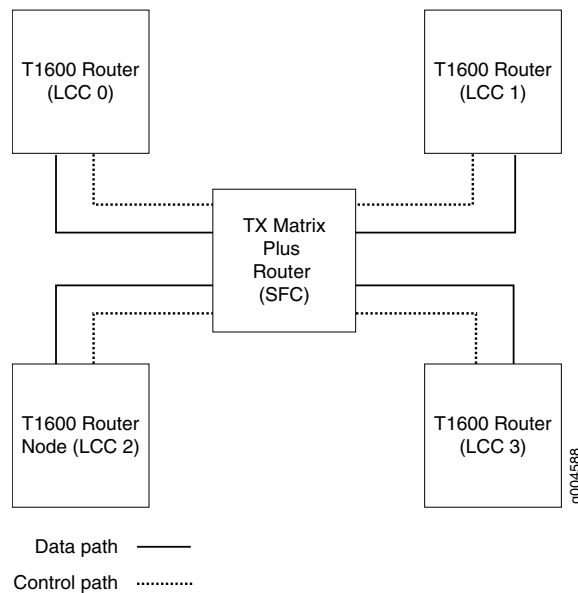
Table 25: One-to-One FPC Numbering for T640 Routers in a Routing Matrix

FPC Numbering	T640 Routers							
LCC 0								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	0	1	2	3	4	5	6	7
LCC 1								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	8	9	10	11	12	13	14	15
LCC 2								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	16	17	18	19	20	21	22	23
LCC 3								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	24	25	26	27	28	29	30	31

Interface Naming for a Routing Matrix Based on a TX Matrix Plus Router

A routing matrix based on a Juniper Networks TX Matrix Plus Router is a multichassis architecture composed of one TX Matrix Plus router and from one to four interconnected T1600 routers. From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router controls all the T1600 routers, as shown in Figure 4 on page 37.

Figure 4: Routing Matrix Based on a TX Matrix Plus Router



A TX Matrix Plus router is also referred to as a *switch-fabric chassis* (SFC). The CLI uses **sfc** to refer to the TX Matrix Plus router. A T1600 router in a routing matrix is also referred to as a *line-card chassis* (LCC). The CLI uses **lcc** as a prefix to refer to a specific T1600 router.

LCCs are assigned numbers, 0 through 3, depending on the hardware setup and connectivity to the TX Matrix Plus router. For more information, see the *TX Matrix Plus Router Hardware Guide*. A routing matrix based on a TX Matrix Plus router can have up to four T1600 routers, and each T1600 router has up to eight FPCs. Therefore, the routing matrix as a whole can have up to 32 FPCs (0 through 31).

In the Junos OS CLI, an interface name has the following format:

type-fpc/pic/port

When you specify the **fpc** number for a T1600 router in a routing matrix, the Junos OS determines which T1600 router contains the specified FPC based on the following assignment:

- On LCC 0, FPC hardware slots 0 through 7 are configured as 0 through 7.
- On LCC 1, FPC hardware slots 0 through 7 are configured as 8 through 15.
- On LCC 2, FPC hardware slots 0 through 7 are configured as 16 through 23.
- On LCC 3, FPC hardware slots 0 through 7 are configured as 24 through 31.

For example, the 1 in **se-1/0/0** refers to FPC hardware slot 1 on the T1600 router labeled **lcc0**. The 11 in **t1-11/2/0** refers to FPC hardware slot 3 on the T1600 router labeled **lcc1**. The 20 in **so-20/0/1** refers to FPC hardware slot 4 on the T1600 router labeled **lcc2**. The 31 in **t3-31/1/0** refers to FPC hardware slot 7 on the T1600 router labeled **lcc3**.

Table 26 on page 38 summarizes the FPC numbering for a routing matrix based on a TX Matrix Plus router.

Table 26: FPC Numbering for T1600 Routers in a Routing Matrix

LCC Numbers Assigned to the T1600 Router	Configuration Numbers
0	0 through 7
1	8 through 15
2	16 through 23
3	24 through 31

Table 27 on page 38 lists each FPC hardware slot and the corresponding configuration numbers for LCCs 0 through 3.

Table 27: One-to-One FPC Numbering for T1600 Routers in a Routing Matrix

FPC Numbering	T1600 Routers							
LCC 0								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	0	1	2	3	4	5	6	7
LCC 1								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	8	9	10	11	12	13	14	15
LCC 2								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	16	17	18	19	20	21	22	23
LCC 3								
Hardware Slots	0	1	2	3	4	5	6	7
Configuration Numbers	24	25	26	27	28	29	30	31

Chassis Interface Naming

You configure some PIC properties, such as framing, at the **[edit chassis]** hierarchy level. Chassis interface naming varies depending on the routing hardware.

- To configure PIC properties for a standalone router, you must specify the FPC and PIC numbers, as follows:

```
[edit chassis]
fpc slot-number {
  pic pic-number {
    ...
  }
}
```

- To configure PIC properties for a T640 or T1600 router configured in a routing matrix, you must specify the LCC, FPC, and PIC numbers, as follows:

```
[edit chassis]
lcc lcc-number {
  fpc slot-number { # Use the hardware FPC slot number
    pic pic-number {
      ...
    }
  }
}
```

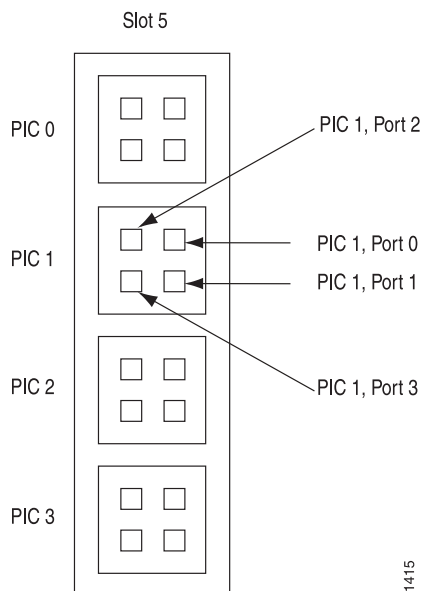
For the FPC slot in a T640 router in a routing matrix, specify the actual hardware slot number, as labeled on the T640 router chassis. Do not use the corresponding software FPC configuration numbers shown in [Table 25 on page 36](#).

For the FPC slot in a T1600 router in a routing matrix, specify the actual hardware slot number, as labeled on the T1600 router chassis. Do not use the corresponding software FPC configuration numbers shown in [Table 26 on page 38](#).

For more information about the **[edit chassis]** hierarchy, see the *Junos OS Administration Library for Routing Devices*.

Examples: Interface Naming

This section provides examples of naming interfaces. For an illustration of where slots, PICs, and ports are located, see [Figure 5 on page 40](#).

Figure 5: Interface Slot, PIC, and Port Locations

For an FPC in slot 1 with two OC3 SONET/SDH PICs in PIC positions 0 and 1, each PIC with two ports uses the following names:

```
so-1/0/0.0
so-1/0/1.0
so-1/1/0.0
so-1/1/1.0
```

An OC48 SONET/SDH PIC in slot 1 and in concatenated mode appears as a single FPC with a single PIC, which has a single port. If this interface has a single logical unit, it has the following name:

```
so-1/0/0.0
```

An OC48 SONET/SDH PIC in slot 1 and in channelized mode has a number for each channel. For example:

```
so-1/0/0:0
so-1/0/0:1
```

For an FPC in slot 1 with a Channelized OC12 PIC in PIC position 2, the DS3 channels have the following names:

```
t3-1/2/0:0
t3-1/2/0:1
t3-1/2/0:2
...
t3-1/2/0:11
```

For an FPC in slot 1 with four OC12 ATM PICs (the FPC is fully populated), the four PICs, each with a single port and a single logical unit, have the following names:

```
at-1/0/0.0
at-1/1/0.0
at-1/2/0.0
```

at-1/3/0.0

In a routing matrix on the T640 router labeled **lcc1**, for an FPC in slot 5 with four SONET OC192 PICs, the four PICs, each with a single port and a single logical unit, have the following names:

so-13/0/0.0
so-13/1/0.0
so-13/2/0.0
so-13/3/0.0

For an FPC in slot 1 with one 4-port ISDN BRI interface card, port 4 has the following name:

br-1/0/4

The first B-channel, the second B-channel, and the control channel have the following names:

bc-1/0/4:1
bc-1/0/4:2
dc-1/0/4:0

Related Documentation

- [Router Interfaces Overview on page 4](#)
- [Physical Part of an Interface Name on page 53](#)
- [Supported Routing Engines by Chassis](#)

Interface Encapsulations Overview

Table 28 on page 41 lists encapsulation support by interface type.

Table 28: Encapsulation Support by Interface Type

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
ae —Aggregated Ethernet interface	ethernet-ccc —Ethernet cross-connect	dix —Ethernet DIXv2 (RFC 894)
	extended-vlan-ccc —Nonstandard TPID tagging for a cross-connect	vlan-ccc —802.1Q tagging for a cross-connect
	extended-vlan-vpls —Extended VLAN virtual private LAN service	
	flexible-ethernet-services —Allows per-unit Ethernet encapsulation configuration	
	vlan-ccc —802.1Q tagging for a cross-connect	
	ethernet-vpls —Ethernet virtual private LAN service	
	vlan-vpls —VLAN virtual private LAN service	

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
as —Aggregated SONET/SDH interface	cisco-hdlc —Cisco-compatible HDLC framing ppp —Serial PPP device	NA
at —ATM1 interface	atm-ccc-cell-relay —ATM cell relay encapsulation for a cross-connect atm-pvc —ATM permanent virtual circuits ethernet-over-atm —Ethernet over ATM encapsulation	atm-ccc-cell-relay —ATM cell relay for CCC atm-ccc-vc-mux —ATM VC for CCC atm-cisco-nlpid —Cisco-compatible ATM NLPID encapsulation atm-nlpid —ATM NLPID encapsulation atm-snap —ATM LLC/SNAP encapsulation atm-tcc-snap —ATM LLC/SNAP for a translational cross-connect atm-tcc-vc-mux —ATM VC for a translational cross-connect atm-vc-mux —ATM VC multiplexing ether-over-atm-llc —Ethernet over ATM (LLC/SNAP) encapsulation
at —ATM2 intelligent queuing (IQ) interface	atm-ccc-cell-relay —ATM cell relay encapsulation for a cross-connect atm-pvc —ATM permanent virtual circuits ethernet-over-atm —Ethernet over ATM encapsulation	atm-ccc-cell-relay —ATM cell relay for CCC atm-ccc-vc-mux —ATM VC for CCC atm-cisco-nlpid —Cisco-compatible ATM NLPID encapsulation atm-mlppp-llc —ATM MLPPP over AAL5/LLC atm-nlpid —ATM NLPID encapsulation atm-ppp-llc —ATM PPP over AAL5/LLC atm-ppp-vc-mux —ATM PPP over raw AAL5 atm-snap —ATM LLC/SNAP encapsulation atm-tcc-snap —ATM LLC/SNAP for a translational cross-connect atm-tcc-vc-mux —ATM VC for a translational cross-connect atm-vc-mux —ATM VC multiplexing ether-over-atm-llc —Ethernet over ATM (LLC/SNAP) encapsulation ether-vpls-over-atm-llc —Ethernet VPLS over ATM (bridging) encapsulation

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
bcm —Gigabit Ethernet internal interfaces	NA	NA
br —Integrated Services Digital Network (ISDN) interface	NA	NA
ci —Container interface	cisco-hdlc —Cisco-compatible HDLC framing ppp —Serial PPP device	aps —SONET interface required for APS configuration.
ds —DS0 interface	cisco-hdlc —Cisco-compatible HDLC framing cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect flexible-frame-relay —Multiple Frame Relay encapsulations frame-relay —Frame Relay encapsulation frame-relay-ccc —Frame Relay for a cross-connect frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect frame-relay-tcc —Frame Relay for a translational cross-connect multilink-frame-relay-uni-nni —Multilink Frame Relay UNI NNI (FRF.16) encapsulation ppp —Serial PPP device ppp-ccc —Serial PPP device for a cross-connect ppp-tcc —Serial PPP device for a translational cross-connect	frame-relay-ccc —Frame Relay DLCI for CCC frame-relay-ppp —PPP over Frame Relay frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
dsc —Discard interface	NA	NA

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
e1 —E1 interface (including channelized STM1-to-E1 interfaces)	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect	
	extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect	
	flexible-frame-relay —Multiple Frame Relay encapsulations	
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
	multilink-frame-relay-uni-nni —Multilink Frame Relay UNI NNI (FRF.16) encapsulation	
	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
e3 —E3 interface (including E3 IQ and IQE interfaces)	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect	
	extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect	
	flexible-frame-relay —Multiple Frame Relay encapsulations	
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	
em —Management and internal Ethernet interfaces	NA	NA

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
fe —Fast Ethernet interface	ethernet-ccc —Ethernet cross-connect ethernet-tcc —Ethernet translational cross-connect ethernet-vpls —Ethernet virtual private LAN service extended-vlan-ccc —Nonstandard TPID tagging for a cross-connect extended-vlan-tcc —802.1Q tagging for a translational cross-connect extended-vlan-vpls —Extended VLAN virtual private LAN service vlan-ccc —802.1Q tagging for a cross-connect vlan-vpls —VLAN virtual private LAN service	dix —Ethernet DIXv2 (RFC 894) vlan-ccc —802.1Q tagging for a cross-connect vlan-vpls —VLAN virtual private LAN service
fxp —Management and internal Ethernet interfaces	NA	NA
ge —Gigabit Ethernet interface (including Gigabit Ethernet IQ interfaces)	ethernet-ccc —Ethernet cross-connect ethernet-tcc —Ethernet translational cross-connect ethernet-vpls —Ethernet virtual private LAN service extended-vlan-ccc —Nonstandard TPID tagging for a cross-connect extended-vlan-tcc —802.1Q tagging for a translational cross-connect extended-vlan-vpls —Extended VLAN virtual private LAN service flexible-ethernet-services —Allows per-unit Ethernet encapsulation configuration vlan-ccc —802.1Q tagging for a cross-connect vlan-vpls —VLAN virtual private LAN service	dix —Ethernet DIXv2 (RFC 894) vlan-ccc —802.1Q tagging for a cross-connect vlan-tcc —802.1Q tagging for a translational cross-connect vlan-vpls —VLAN virtual private LAN service
ixgbe —10-Gigabit Ethernet internal interfaces	NA	NA
lo —Loopback interface; the Junos OS automatically configures one loopback interface (lo0)	NA	NA

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
ls —Link services interface	multilink-frame-relay-uni-nni —Multilink Frame Relay UNI NNI (FRF.16) encapsulation	multilink-frame-relay-end-to-end —Multilink Frame Relay end-to-end (FRF.15) multilink-ppp —Multilink PPP
lsq —Link services IQ interface	multilink-frame-relay-uni-nni —Multilink Frame Relay UNI NNI (FRF.16) encapsulation	multilink-frame-relay-end-to-end —Multilink Frame Relay end-to-end (FRF.15) multilink-ppp —Multilink PPP
lt —Logical tunnel interface	NA	ethernet —Ethernet service ethernet-vpls —Ethernet virtual private LAN service ethernet-ccc —Ethernet cross-connect frame-relay —Frame Relay encapsulation frame-relay-ccc —Frame Relay for a cross-connect vlan —VLAN service vlan-ccc —802.1Q tagging for a cross-connect vlan-vpls —VLAN virtual private LAN service
ml —Multilink interface (including Multilink Frame Relay and MLPPP)	NA	multilink-frame-relay-end-to-end —Multilink Frame Relay end-to-end (FRF.15) multilink-ppp —Multilink PPP

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
se —Serial interface (including EIA-530, V.35, and X.21 interfaces)	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
so—SONET/SDH interface	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect	multilink-frame-relay-end-to-end —IQE SONET PICs support Multilink Frame Relay end-to-end (FRF.15)
	extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect	multilink-ppp —IQE SONET PICs support Multilink PPP
	flexible-frame-relay —Multiple Frame Relay encapsulations	
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
t1—T1 interface (including channelized DS3-to-DS1 interfaces)	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect	
	extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect	
	flexible-frame-relay —Multiple Frame Relay encapsulations	
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
	multilink-frame-relay-uni-nni —Multilink Frame Relay UNI NNI (FRF.16) encapsulation	
	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	

Table 28: Encapsulation Support by Interface Type (*continued*)

Interface Type	Physical Interface Encapsulation	Logical Interface Encapsulation
t3 —T3 interface (including channelized OC12-to-DS3 interfaces)	cisco-hdlc —Cisco-compatible HDLC framing	frame-relay-ccc —Frame Relay DLCI for CCC
	cisco-hdlc-ccc —Cisco-compatible HDLC framing for a cross-connect	frame-relay-ppp —PPP over Frame Relay
	cisco-hdlc-tcc —Cisco-compatible HDLC framing for a translational cross-connect	frame-relay-tcc —Frame Relay DLCI for a translational cross-connect
	extended-frame-relay-ccc —Any Frame Relay DLCI for a cross-connect	
	extended-frame-relay-tcc —Any Frame Relay DLCI for a translational cross-connect	
	flexible-frame-relay —Multiple Frame Relay encapsulations	
	frame-relay —Frame Relay encapsulation	
	frame-relay-ccc —Frame Relay for a cross-connect	
	frame-relay-port-ccc —Frame Relay port encapsulation for a cross-connect	
	frame-relay-tcc —Frame Relay for a translational cross-connect	
Controller-level channelized IQ interfaces (cau4 , coc1 , coc3 , coc12 , cstm1 , ct1 , ct3 , ce1)	ppp —Serial PPP device	
	ppp-ccc —Serial PPP device for a cross-connect	
	ppp-tcc —Serial PPP device for a translational cross-connect	
Services interfaces (cp , gr , ip , mo , vt , es , mo , rsp , sp)	NA	NA
Unconfigurable, internally generated interfaces (gre , ipip , learning-chip (lc), lsi , tap , mt , mtun , pd , pe , pimd , pime)	NA	NA



NOTE: You can configure GRE interfaces (**gre-x/y/z**) only for GMPLS control channels. GRE interfaces are not supported or configurable for other applications. For more information about GMPLS, see the *Junos OS MPLS Applications Library for Routing Devices* and the *Junos OS, Release 15.1*.

- Related Documentation**
- [Understanding Transient Interfaces on page 5](#)
 - [Router Interfaces Overview on page 4](#)
 - [Types of Interfaces Overview on page 4](#)

Interface Descriptors Overview

When you configure an interface, you are effectively specifying the properties for a physical interface descriptor. In most cases, the physical interface descriptor corresponds to a single physical device and consists of the following parts:

- The interface name, which defines the media type
- The slot in which the FPC or DPC is located
- The location on the FPC in which the PIC is installed
- The PIC or DPC port
- The interface's channel and logical unit numbers (optional)

Each physical interface descriptor can contain one or more logical interface descriptors. These allow you to map one or more logical (or virtual) interfaces to a single physical device. Creating multiple logical interfaces is useful for ATM, Frame Relay, and Gigabit Ethernet networks, in which you can associate multiple virtual circuits, data-link connections, or virtual LANs (VLANs) with a single interface device.

Each logical interface descriptor can have one or more family descriptors to define the protocol family that is associated with and allowed to run over the logical interface.

The following protocol families are supported:

- Internet Protocol version 4 (IPv4) suite (inet)
- Internet Protocol version 6 (IPv6) suite (inet6)
- Circuit cross-connect (CCC)
- Translational cross-connect (TCC)
- International Organization for Standardization (ISO)
- Multilink Frame Relay end-to-end (MLFR end-to-end)
- Multilink Frame Relay user-to-network interface network-to-network interface (MLFR UNI NNI)
- Multilink Point-to-Point Protocol (MLPPP)
- Multiprotocol Label Switching (MPLS)
- Trivial Network Protocol (TNP)
- (M Series, T Series, and MX Series routers only) Virtual private LAN service (VPLS)

Finally, each family descriptor can have one or more address entries, which associate a network address with a logical interface and hence with the physical interface.

You configure the various interface descriptors as follows:

- You configure the physical interface descriptor by including the **interfaces** *interface-name* statement.
- You configure the logical interface descriptor by including the **unit** statement within the **interfaces** *interface-name* statement or by including the **.logical** descriptor at the end of the interface name, as in **t3-0/0/0.1**, where the logical unit number is 1, as shown in the following examples:

```
[edit]
user@host# set interfaces t3-0/0/0 unit 1
[edit]
user@host# edit interfaces t3-0/0/0.1
[edit interfaces t3-0/0/0]
user@host# set unit 1
```

- You configure the family descriptor by including the **family** statement within the **unit** statement.
- You configure address entries by including the **address** statement within the **family** statement.
- You configure tunnels by including the **tunnel** statement within the **unit** statement.



NOTE: The address of a logical interface cannot be the same as a tunnel interface's source or destination address. If you try to configure a logical interface with a tunnel interface's address or vice versa, a commit failure will occur.

Related Documentation

- [Router Interfaces Overview on page 4](#)

Physical Part of an Interface Name

- [Interface Names for ACX Series Universal Access Routers on page 53](#)
- [Interface Names for M Series and T Series Routers on page 54](#)
- [MX Series Router Interface Names on page 54](#)
- [Interface Names for PTX Series Routers on page 55](#)

Interface Names for ACX Series Universal Access Routers

ACX Series routers do not have actual PIC devices. Instead they have built-in network ports on the front panel of the router. These ports are named using the same naming convention used for routers with PIC devices with the understanding that the FPC, PIC and port are pseudo devices. When you display information about one of these ports,

you specify the interface type, the slot for the Flexible PIC Concentrator (FPC), the slot on the FPC for the Physical Interface Card (PIC), and the configured port number.

In the physical part of the interface name, a hyphen (-) separates the media type from the FPC number, and a slash (/) separates the FPC, PIC, and port numbers:

type-fpc/pic/port

Interface Names for M Series and T Series Routers

On M Series and T Series routers, when you display information about an interface, you specify the interface type, the slot in which the Flexible PIC Concentrator (FPC) is installed, the slot on the FPC in which the Physical Interface Card (PIC) is located, and the configured port number.

In the physical part of the interface name, a hyphen (-) separates the media type from the FPC number, and a slash (/) separates the FPC, PIC, and port numbers:

type-fpc/pic/port



NOTE: Exceptions to the *type-fpc/pic/port* physical description include the aggregated Ethernet and aggregated SONET/SDH interfaces, which use the syntax *ae number* and *as number*, respectively.

MX Series Router Interface Names

On MX Series routers when you display information about an interface, you specify the interface type, the Dense Port Concentrator (DPC), Flexible PIC Concentrator (FPC), or Modular Port Concentrator (MPC) slot, the PIC or MIC slot, and the configured port number.



NOTE: Although the MX Series routers use DPCs, FPCs, MPCs, MICs, and PICs, command syntax in this book is shown as *fpc/pic/port* for simplicity.

In the physical part of the interface name, a hyphen (-) separates the media type from the FPC number, and a slash (/) separates the DPC, FPC or MPC, MIC or PIC, and port numbers:

type-fpc/pic/port

- *fpc*—Slot in which the DPC, FPC, or MPC is installed.
- *pic*—Slot on the FPC in which the PIC is located.

For DPCs, MICs, and the 16-port MPC, the PIC value is a logical grouping of ports and varies on different platforms.

- *port*—Port number on the DPC, PIC, MPC, or MIC.

Interface Names for PTX Series Routers

On PTX Series Packet Transport Routers, when you display information about an interface, you specify the interface type, the slot in which the Flexible PIC Concentrator (FPC) is installed, the slot on the FPC in which the Physical Interface Card (PIC) is located, and the configured port number.



NOTE:

- The PTX router supports Ethernet type interfaces only. The media type portion of the physical interface name, *type* supports the Ethernet interface type only: **et**.
- In the CLI, all PTX3000 PICs are represented as **pic0**. For more information, see *PTX3000 PIC Description*

In the physical part of the interface name, a hyphen (-) separates the media type (**et**) from the FPC number, and a slash (/) separates the FPC, PIC, and port numbers:

type-fpc/pic/port

Related Documentation

- [Interface Naming Overview on page 27](#)
- [Logical Part of an Interface Name on page 33](#)

Displaying Interface Configurations Overview

To display a configuration, use either the **show** command in configuration mode or the **show configuration** top-level command. Interfaces are listed in numerical order, from lowest to highest slot number, then from lowest to highest PIC number, and finally from lowest to highest port number.

Related Documentation

- [Router Interfaces Overview on page 4](#)

CHAPTER 2

Configuring Physical Interface Properties

- [Physical Interface Configuration Statements Overview on page 58](#)
- [Physical Interfaces Properties Statements List on page 68](#)
- [Interface Ranges on page 84](#)
- [Specifying an Aggregated Interface on page 93](#)
- [Media MTU Overview on page 93](#)
- [Media MTU Sizes by Interface Type on page 94](#)
- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)
- [Configuring Interface Description on page 102](#)
- [Configuring the Media MTU on page 104](#)
- [Configuring the Interface Speed on page 105](#)
- [Configuring the Link Characteristics on page 109](#)
- [Interface Alias Names Overview on page 110](#)
- [Example: Adding an Interface Alias Name on page 111](#)
- [Clock Source Overview on page 115](#)
- [Configuring the Clock Source on page 116](#)
- [Configuring Interface Encapsulation on Physical Interfaces on page 117](#)
- [Configuring Interface Encapsulation on PTX Series Packet Transport Routers on page 120](#)
- [Configuring Keepalives on page 121](#)
- [Configuring the PPP Challenge Handshake Authentication Protocol on page 123](#)
- [Configuring the PPP Password Authentication Protocol On a Physical Interface on page 126](#)
- [Configuring PPP Address and Control Field Compression on page 129](#)
- [Configuring the PPP Protocol Field Compression on page 131](#)
- [Monitoring a PPP Session on page 132](#)
- [Tracing Operations of the pppd Process on page 133](#)
- [Configuring the Router as a DCE with Frame Relay Encapsulation on page 134](#)
- [Receive and Transmit Leaky Bucket Properties Overview on page 134](#)

- [Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135](#)
- [Understanding Unidirectional Traffic Flow on Physical Interfaces on page 137](#)
- [Enabling Unidirectional Traffic Flow on Physical Interfaces on page 138](#)
- [Physical Interface Damping Overview on page 139](#)
- [Damping Shorter Physical Interface Transitions on page 145](#)
- [Damping Longer Physical Interface Transitions on page 146](#)
- [Example: Configuring Physical Interface Damping on page 147](#)
- [Configuring Multiservice Physical Interface Properties on page 149](#)
- [Enabling or Disabling SNMP Notifications on Physical Interfaces on page 150](#)
- [Configuring Accounting for the Physical Interface on page 151](#)
- [Disabling a Physical Interface on page 153](#)

Physical Interface Configuration Statements Overview

The software driver for each network media type sets reasonable default values for general interface properties, such as the interface's maximum transmission unit (MTU) size, receive and transmit leaky bucket properties, link operational mode, and clock source.

M Series, MX Series, and T Series routers are factory configured according to the specific router, its features, and its physical interfaces. This section includes a default configuration example showing the statements used to configure the physical interfaces properties. Additional statements are used to set properties for specific interface types and are described in [“Physical Interfaces Properties Statements List” on page 68](#).

To modify any of the default general interface properties, include the appropriate statements at the `[edit interfaces interface-name]` hierarchy level:



NOTE: The following configuration hierarchy and its included statements are shown only as an example of a configuration statement hierarchy and should not be referenced for resolving actual configurations. For information on a specific hierarchy level, see the hierarchy level document for that specific hierarchy, for example [“`\[edit interfaces\]` Hierarchy Level” on page 356](#).

```
interfaces {
  traceoptions {
    file filename <files number> <match regular-expression> <size size> <world-readable |
      no-world-readable>;
    flag flag <disable>;
  }
  interface-name {
    accounting-profile name;
    aggregated-ether-options {
      (flow-control | no-flow-control);
      lacp {
        (active | passive);
        link-protection{
```

```

        disable;
        (revertive | non-revertive (Interfaces));
        periodic interval;
        system-priority priority;
    }
    link-protection;
    link-speed speed;
    (loopback | no-loopback);
    minimum-links number;
    source-address-filter {
        mac-address
    }
    (source-filtering | no-source-filtering);
}
aggregated-sonet-options {
    link-speed speed | mixed;
    minimum-links number;
}
atm-options {
    cell-bundle-size cells;
    ilmi;
    linear-red-profiles profile-name {
        high-plp-max-threshold percent;
        low-plp-max-threshold percent;
        queue-depth cells high-plp-threshold percent low-plp-threshold percent;
    }
}
mpls {
    pop-all-labels {
        required-depth number;
    }
}
pic-type (atm1 | atm2);
plp-to-clp;
promiscuous-mode {
    vpi vpi-identifier;
}
scheduler-maps map-name {
    forwarding-class class-name {
        epd-threshold cells plp1 cells;
        linear-red-profile profile-name;
        priority (high | low);
        transmit-weight (cells number | percent number);
    }
    vc-cos-mode (alternate | strict);
}
vpi vpi-identifier {
    maximum-vcs maximum-vcs;
    oam-liveness {
        up-count cells;
        down-count cells;
    }
    oam-period (seconds | disable);
    shaping {
        (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
        rate burst length);
        queue-length number;
    }
}

```

```
    }  
  }  
}  
clocking clock-source;  
data-input (system | interface interface-name);  
dce;  
serial-options {  
  clock-rate rate;  
  clocking-mode (dce | internal | loop);  
  control-polarity (negative | positive);  
  cts-polarity (negative | positive);  
  dcd-polarity (negative | positive);  
  dce-options {  
    control-signal (assert | de-assert | normal);  
    cts (ignore | normal | require);  
    dcd (ignore | normal | require);  
    dsr (ignore | normal | require);  
    dtr signal-handling-option;  
    ignore-all;  
    indication (ignore | normal | require);  
    rts (assert | de-assert | normal);  
    tm (ignore | normal | require);  
  }  
  dsr-polarity (negative | positive);  
  dte-options {  
    control-signal (assert | de-assert | normal);  
    cts (ignore | normal | require);  
    dcd (ignore | normal | require);  
    dsr (ignore | normal | require);  
    dtr signal-handling-option;  
    ignore-all;  
    indication (ignore | normal | require);  
    rts (assert | de-assert | normal);  
    tm (ignore | normal | require);  
  }  
  dtr-circuit (balanced | unbalanced);  
  dtr-polarity (negative | positive);  
  encoding (nrz | nrzi);  
  indication-polarity (negative | positive);  
  line-protocol protocol;  
  loopback mode;  
  rts-polarity (negative | positive);  
  tm-polarity (negative | positive);  
  transmit-clock invert;  
}  
description text;  
dialer-options {  
  pool pool-name <priority priority>;  
}  
disable;  
ds0-options {  
  bert-algorithm algorithm;  
  bert-error-rate rate;  
  bert-period seconds;  
  byte-encoding (nx56 | nx64);  
  fcs (16 | 32);
```

```

idle-cycle-flag (flags | ones);
invert-data;
loopback payload;
start-end-flag (filler | shared);
}
e1-options {
  bert-error-rate rate;
  bert-period seconds;
  fcs (16 | 32);
  framing (g704 | g704-no-crc4 | unframed);
  idle-cycle-flag (flags | ones);
  invert-data;
  loopback (local | remote);
  start-end-flag (filler | shared);
  timeslots time-slot-range;
}
e3-options {
  atm-encapsulation (direct | plcp);
  bert-algorithm algorithm;
  bert-error-rate rate;
  bert-period seconds;
  buildout feet;
  compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
  fcs (16 | 32);
  framing (g.751 | g.832);
  idle-cycle-flag (filler | shared);
  invert-data;
  loopback (local | remote);
  (payload-scrambler | no-payload-scrambler);
  start-end-flag (filler | shared);
  (unframed | no-unframed);
}
encapsulation type;
es-options {
  backup-interface es-fpc/pic/port;
}
fastether-options {
  802.3ad aex;
  (flow-control | no-flow-control);
  ignore-l3-incompletes;
  ingress-rate-limit rate;
  (loopback | no-loopback);
  mpls {
    pop-all-labels {
      required-depth number;
    }
  }
  source-address-filter {
    mac-address;
  }
  (source-filtering | no-source-filtering);
}
flexible-vlan-tagging;
gigether-options {
  802.3ad aex;
  (asynchronous-notification | no-asynchronous-notification);
}

```



```

    spid2 spid-string;
    static-tei-val value;
    switch-type (att5e | etsi | nil | ntdms100 | ntt);
    t310 seconds;
    tei-option (first-call | power-up);
}
keepalives <down-count number> <interval seconds> <up-count number>;
link-mode mode;
lmi {
    lmi-type (ansi | itu | c-lmi);
    n391dte number;
    n392dce number;
    n392dte number;
    n393dce number;
    n393dte number;
    t391dte seconds;
    t392dce seconds;
}
lsq-failure-options {
    no-termination-request;
    [ trigger-link-failure interface-name ];
}
mac mac-address;
mlfr-uni-nni-bundle-options {
    acknowledge-retries number;
    acknowledge-timer milliseconds;
    action-red-differential-delay (disable-tx | remove-link);
    cisco-interopability send-lip-remove-link-for-link-reject;
    drop-timeout milliseconds;
    fragment-threshold bytes;
    hello-timer milliseconds;
    link-layer-overhead percent;
    lmi-type (ansi | itu | c-lmi);
    minimum-links number;
    mrru bytes;
    n391 number;
    n392 number;
    n393 number;
    red-differential-delay milliseconds;
    t391 seconds;
    t392 seconds;
    yellow-differential-delay milliseconds;
    encapsulation type;
}
modem-options {
    dialin (console | routable);
    init-command-string initialization-command-string;
}
mtu bytes;
multiservice-options {
    (core-dump | no-core-dump);
    (syslog | no-syslog);
    (dump-on-flow-control);
    flow-control-options {
        down-on-flow-control;
        dump-on-flow-control;
    }
}

```

```
        reset-on-flow-control;
    }
}
native-vlan-id number;
no-gratuitous-arp-request;
no-keepalives;
no-partition {
    interface-type type;
}
optics-options {
    wavelength nm;
    alarm alarm-name {
        (syslog | link-down);
    }
    warning warning-name {
        (syslog | link-down);
    }
}
partition partition-number oc-slice oc-slice-range interface-type type;
timeslots time-slot-range;
passive-monitor-mode;
per-unit-scheduler;
ppp-options {
    chap {
        access-profile name;
        default-chap-secret name;
        local-name name;
        passive;
    }
    compression {
        acfc;
        pfc;
    }
    dynamic-profile profile-name;
    no-termination-request;
    pap {
        access-profile name;
        local-name name;
        local-password password;
        passive;
    }
}
receive-bucket {
    overflow (discard | tag);
    rate percentage;
    threshold bytes;
}
redundancy-options {
    primary sp-fpc/pic/port;
    secondary sp-fpc/pic/port;
}
schedulers number;
serial-options {
    clock-rate rate;
    clocking-mode (dce | internal | loop);
    control-polarity (negative | positive);
```

```

cts-polarity (negative | positive);
dcd-polarity (negative | positive);
dce-options {
    control-signal (assert | de-assert | normal);
    cts (ignore | normal | require);
    dcd (ignore | normal | require);
    dsr (ignore | normal | require);
    dtr signal-handling-option;
    ignore-all;
    indication (ignore | normal | require);
    rts (assert | de-assert | normal);
    tm (ignore | normal | require);
}
dsr-polarity (negative | positive);
dte-options {
    control-signal (assert | de-assert | normal);
    cts (ignore | normal | require);
    dcd (ignore | normal | require);
    dsr (ignore | normal | require);
    dtr signal-handling-option;
    ignore-all;
    indication (ignore | normal | require);
    rts (assert | de-assert | normal);
    tm (ignore | normal | require);
}
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
services-options {
    inactivity-timeout seconds;
    open-timeout seconds;
    syslog {
        host hostname {
            facility-override facility-name;
            log-prefix prefix-number;
            services priority-level;
        }
    }
}
shdsl-options {
    annex (annex-a | annex-b);
    line-rate line-rate;
    loopback (local | remote);
    snr-margin {
        snext margin;
    }
}
sonet-options {
    aggregate asx;

```

```
aps {
    advertise-interval milliseconds;
    authentication-key key;
    force;
    hold-time milliseconds;
    lockout;
    neighbor address;
    paired-group group-name;
    preserve-interface;
    protect-circuit group-name;
    request;
    revert-time seconds;
    switching-mode (bidirectional | unidirectional);
    working-circuit group-name;
}
bytes {
    c2 value;
    e1-quiet value;
    f1 value;
    f2 value;
    s1 value;
    z3 value;
    z4 value;
}
fcs (16 | 32);
loopback (local | remote);
mpls {
    pop-all-labels {
        required-depth number;
    }
}
path-trace trace-string;
(payload-scrambler | no-payload-scrambler);
rfc-2615;
trigger {
    defect ignore;
    hold-time up milliseconds down milliseconds;
}
vtmapping (itu-t | klm);
(z0-increment | no-z0-increment);
}
(speed (10m | 100m | 1g | auto) | speed (auto | 1Gbps | 100Mbps | 10Mbps) | speed
(oc3 | oc12 | oc48));
stacked-vlan-tagging;
switch-options {
    switch-port port-number {
        (auto-negotiation | no-auto-negotiation);
        speed (10m | 100m | 1g);
        link-mode (full-duplex | half-duplex);
    }
}
}
multicast-statistics
t1-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
```

```

    buildout value;
    byte-encoding (nx56 | nx64);
    crc-major-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5);
    crc-minor-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5 | 5e-6 | 1e-6);
    fcs (16 | 32);
    framing (esf | sf);
    idle-cycle-flag (flags | ones);
    invert-data;
    line-encoding (ami | b8zs);
    loopback (local | payload | remote);
    remote-loopback-respond;
    start-end-flag (filler | shared);
    timeslots time-slot-range;
}
t3-options {
    atm-encapsulation (direct | plcp);
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout feet;
    (cbit-parity | no-cbit-parity);
    compatibility-mode (adtran | digital-link | kentrox | larscom | verilink) <subrate
        value>;
    fcs (16 | 32);
    (feac-loop-respond | no-feac-loop-respond);
    idle-cycle-flag value;
    (long-buildout | no-long-buildout);
    (loop-timing | no-loop-timing);
    loopback (local | payload | remote);
    (mac | no-mac);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag (filler | shared);
}
traceoptions {
    flag flag <flag-modifier> <disable>;
}
transmit-bucket {
    overflow discard;
    rate percentage;
    threshold bytes;
}
(traps | no-traps);
unidirectional;
vlan-tagging;
vlan-vci-tagging;
unit logical-unit-number {
    logical-interface-statements;
}
}
}

```

Related Documentation

- [Router Interfaces Overview on page 4](#)

Physical Interfaces Properties Statements List

Table 29 on page 68 lists statements that you can use to configure physical interfaces.

Table 29: Statements for Physical Interface Properties

Statement	Interface Types	Usage Guidelines
802.3ad aex	Aggregated Ethernet interfaces	<i>Aggregated Ethernet Interfaces Overview</i>
access-profile <i>name</i>	Interfaces with Point-to-Point Protocol (PPP) encapsulation	"Configuring the PPP Challenge Handshake Authentication Protocol" on page 123
accounting-profile <i>name</i>	All	"Configuring Accounting for the Physical Interface" on page 151
acfc	Interfaces with PPP encapsulation	<i>Configuring PPPoE</i>
acknowledge-retries <i>number</i>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
acknowledge-timer <i>milliseconds</i>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
action-red-differential-delay (disable-tx remove-link)	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
advertise-interval <i>milliseconds</i>	SONET/SDH interfaces	<i>Configuring APS Timers</i>
aggregate	Gigabit Ethernet intelligent queuing (IQ and IQE) interfaces and Gigabit Ethernet interfaces with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
aggregate asx	Aggregated SONET/SDH interfaces	<i>Configuring Aggregated SONET/SDH Interfaces</i>
aggregated-ether-options	Aggregated Ethernet interfaces	<i>Aggregated Ethernet Interfaces Overview</i>
aggregate-ports	SONET/SDH interfaces	<i>Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode</i>
aggregated-sonet-options	Aggregated SONET/SDH interfaces	<i>Configuring Aggregated SONET/SDH Interfaces</i>
alarm alarm-name (syslog link-down)	10-Gigabit Ethernet interfaces	<i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>alias</code> <i>alias-name</i> ;	All	“Example: Adding an Interface Alias Name” on page 111
<code>annex</code> (annex-a annex-b)	SONET interfaces using annex-b for MSP switching on M320 and M120 Routers	Configuring Basic Automatic Protect Switching
<code>aps</code>	SONET/SDH interfaces	SONET/SDH Interfaces Overview
<code>atm-encapsulation</code> (direct plcp)	E3 and T3 traffic over Asynchronous Transfer Mode (ATM) interfaces	Configuring E3 and T3 Parameters on ATM Interfaces
<code>atm-options</code>	ATM1 and ATM2 IQ interfaces	“Interface Encapsulations Overview” on page 41
<code>authentication-key</code> <i>key</i>	SONET/SDH interfaces	SONET/SDH Interfaces Overview
<code>bandwidth-limit</code> <i>bps</i>	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	Configuring Gigabit Ethernet Policers
<code>bert-algorithm</code> <i>algorithm</i>	E3, T1, T3, multichannel DS3, channelized interfaces (DS3, OC12, and STM1), and channelized IQ and IQE interfaces (E1 and DS3)	“Configuring Interface Diagnostics Tools to Test the Physical Layer Connections” on page 317
<code>bert-error-rate</code> <i>rate</i>	E1, E3, T1, T3, and channelized interfaces (DS3, OC3, OC12, and STM1)	“Configuring Interface Diagnostics Tools to Test the Physical Layer Connections” on page 317
<code>bert-period</code> <i>seconds</i>	E1, E3, T1, T3, and channelized interfaces (DS3, OC12, and STM1)	“Configuring Interface Diagnostics Tools to Test the Physical Layer Connections” on page 317
Configuring the T1 Buildout <i>value</i>	T1 interfaces	Configuring the T1 Buildout
<code>buildout</code> <i>feet</i>	E3 and T3 traffic over ATM interfaces	Configuring E3 and T3 Parameters on ATM Interfaces
<code>burst-size-limit</code> <i>bytes</i>	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	Configuring Gigabit Ethernet Policers
<code>byte-encoding</code> (nx56 nx64)	DS0 and T1 interfaces	Configuring T1 Byte Encoding
<code>bytes</code> [<i>values</i>]	SONET/SDH interfaces	Configuring SONET/SDH Header Byte Values to Identify Error Conditions

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
cbit-parity no-cbit-parity	T3 interfaces	<i>Disabling T3 C-Bit Parity Mode</i>
cbr rate	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
cell-bundle-size cells	ATM2 IQ interfaces using ATM Layer 2 circuit cell-relay transport mode	<i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum Overview</i>
chap	Interfaces with PPP encapsulation	"Configuring the PPP Challenge Handshake Authentication Protocol" on page 123
cisco-interoperability send-lip-remove-link-for-link-reject	link services IQ (lsq) interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
classifier	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>
clocking clock-source	ATM, DS0, E1, E3, SONET/SDH, T1, and T3 interfaces	"Configuring the Clock Source" on page 116
clocking-mode (dce internal loop)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Clocking Mode" on page 300
clock-rate rate	Serial interfaces (EIA-530 and V.35)	"Configuring the DTE Clock Rate" on page 301
compatibility-mode mode	E3 and T3 interfaces	<i>Configuring the E3 CSU Compatibility Mode and Configuring the T3 CSU Compatibility Mode</i>
compression	Interfaces with PPP encapsulation	"Configuring the PPP Protocol Field Compression" on page 131
control-polarity (negative positive)	Serial interfaces (X.21)	"Configuring Serial Signal Polarities" on page 305
control-signal (assert de-assert normal)	Serial interfaces (X.21)	"Configuring the Serial Signal Handling" on page 302
core-dump no-core-dump)	Adaptive services, monitoring services, and collector interfaces	"Configuring Multiservice Physical Interface Properties" on page 149
cts (ignore normal require)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Signal Handling" on page 302
cts-polarity (negative positive)	Serial interfaces (EIA-530 and V.35)	"Configuring Serial Signal Polarities" on page 305
dcd (ignore normal require)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Signal Handling" on page 302

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>dcd-polarity</code> (negative positive)	Serial interfaces (EIA-530 and V.35)	"Configuring Serial Signal Polarities" on page 305
<code>dce</code>	Interfaces with Frame Relay encapsulation	"Configuring the Router as a DCE with Frame Relay Encapsulation" on page 134
<code>default-chap-secret</code> <i>name</i>	Interfaces with Point-to-Point Protocol (PPP) encapsulation	"Configuring the PPP Challenge Handshake Authentication Protocol" on page 123
<code>description</code> <i>text</i>	All	"Configuring Interface Description" on page 102
<code>dialer-options</code>	ISDN interfaces	<i>Configuring ISDN Physical Interface Properties</i>
<code>disable</code>	All	"Disabling a Physical Interface" on page 153 and "Tracing Operations of an Individual Router Interface" on page 311
<code>dot1x</code>	802.1x Port-Based Network Access Control	<i>IEEE 802.1x Port-Based Network Access Control Overview</i>
<code>down-count</code>	ATM interfaces	<i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>
<code>drop-timeout</code> <i>milliseconds</i>	Multilink, link services, and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>ds0-options</code>	DS0 interfaces	<i>Channelized Interfaces Overview</i>
<code>dsr</code> (ignore normal require)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Signal Handling" on page 302
<code>dsr-polarity</code> (negative positive)	Serial interfaces (EIA-530 and V.35)	"Configuring Serial Signal Polarities" on page 305
<code>dte-options</code>	Serial interfaces (EIA-530, V.35, and X.21) on M Series and T Series routers	"Configuring the Serial Signal Handling" on page 302
<code>dtr</code> <i>signal-handling-option</i>	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Signal Handling" on page 302
<code>dtr-circuit</code> (balanced unbalanced)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial DTR Circuit" on page 305
<code>dtr-polarity</code> (negative positive)	Serial interfaces (EIA-530 and V.35)	"Configuring Serial Signal Polarities" on page 305
<code>e1-options</code>	E1 interfaces	<i>E1 Interfaces Overview</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
e3-options	E3 interfaces	<i>E3 Interfaces Overview</i>
encapsulation type	All interfaces, except loopback and multicast tunnel	“Configuring Interface Encapsulation on Physical Interfaces” on page 117
encoding (nrz nrzi)	Serial interfaces (EIA-530, V.35, and X.21)	“Configuring Serial Line Encoding” on page 308
epd-threshold cells	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
es-options	ES interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
ethernet-policer-profile	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
ethernet-switch-profile	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, Aggregated Ethernet with Gigabit Ethernet IQ interfaces, and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers, Configuring MAC Address Filtering, and Configuring the Management Ethernet Interface</i>
facility-override facility-name	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
fastether-options	Fast Ethernet interfaces	<i>Ethernet Interfaces Overview</i>
fcs (16 32)	E1/E3, SONET/SDH, and T1/T3 interfaces	<i>Configuring the E1 Frame Checksum, Configuring the E3 Frame Checksum, Configuring the SONET/SDH Frame Checksum, Configuring the T1 Frame Checksum, and Configuring the T3 Frame Checksum</i>
feac-loop-respond no-feac-loop-respond	T3 interfaces	<i>Configuring the T3 FEAC Response</i>
flow-control no-flow-control	Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces	<i>Configuring Flow Control</i>
force	SONET/SDH interfaces	<i>Configuring Switching Between the Working and Protect Circuits</i>
forwarding-class class-name	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>forwarding-class class-name</code>	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>
<code>fragment-threshold bytes</code>	Multilink, link services, and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>framing framing-type</code>	E1, E3, and T1 interfaces	<i>Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E1 Framing, and Configuring T1 Framing</i>
<code>framing framing-type</code>	10-Gigabit Ethernet interfaces	<i>10-Gigabit Ethernet Framing Overview</i>
<code>framing framing-type</code>	SONET interfaces	<i>Configuring SONET/SDH Framing Mode for Ports</i>
<code>gether-options</code>	Gigabit Ethernet and Tri-Rate Ethernet copper interfaces	<i>Ethernet Interfaces Overview</i>
<code>(gratuitous-arp-reply no-gratuitous-arp-reply)</code>	Ethernet interfaces	<i>Configuring Gratuitous ARP</i>
<code>hello-timer milliseconds</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>high-plp-max-threshold</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>high-plp-threshold percent</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>hold-time milliseconds</code>	SONET/SDH interfaces	<i>SONET/SDH Interfaces Overview</i>
<code>hold-time up milliseconds down milliseconds</code>	All interfaces, except aggregated SONET/SDH, generalized routing encapsulation (GRE) tunnel, and IP tunnel	<i>Configuring SONET/SDH Defect Triggers</i>
<code>host hostname</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>ieee802.1p premium [values]</code>	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>
<code>idle-cycle-flag value</code>	E1, E3, T1, and T3 interfaces	<i>Configuring the E1 Idle Cycle Flag, Configuring the E3 Idle Cycle Flag, Configuring the T1 Idle Cycle Flag, and Configuring the T3 Idle Cycle Flag</i>
<code>ignore-all</code>	Serial interfaces (EIA-530, V.35, and X.21)	“Configuring the Serial Signal Handling” on page 302
<code>ilmi</code>	ATM interfaces	<i>Configuring Communication with Directly Attached ATM Switches and Routers</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>inactivity-timeout seconds</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>indication</code> (ignore normal require)	Serial interfaces (X.21)	"Configuring the Serial Signal Handling" on page 302
<code>indication-polarity</code> (negative positive)	Serial interfaces (X.21)	"Configuring Serial Signal Polarities" on page 305
<code>ingress-rate-limit rate</code>	8-port, 12-port, and 48-port Fast Ethernet interfaces	<i>Configuring the Ingress Rate Limit</i>
<code>input-priority-map</code>	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>
<code>interface-type type</code>	Channelized IQ and IQE interfaces, ISDN interfaces	<i>Channelized Interfaces Overview and Configuring ISDN Physical Interface Properties</i>
<code>invert-data</code>	DS0, E1, E3, and T1 interfaces	<i>Configuring E1 Data Inversion, Configuring E3 Data Inversion, and Configuring T1 Data Inversion</i>
<code>isdn-options</code>	ISDN interfaces	<i>Configuring ISDN Logical Interface Properties</i>
<code>keepalives</code> <down-count <i>number</i> <interval <i>seconds</i> > <up-count <i>number</i> >	Aggregated SONET/SDH, DS0, E1, E3, SONET/SDH, T1, and T3 interfaces	"Configuring Keepalives" on page 121
<code>lACP mode</code>	Aggregated Ethernet interfaces	<i>Configuring LACP for Aggregated Ethernet Interfaces</i>
<code>line-encoding</code> (ami b8zs)	T1 interfaces	<i>Configuring T1 Line Encoding</i>
<code>line-protocol protocol</code>	Serial interfaces (EIA-530, V.35, and X.21)	"Configuring the Serial Line Protocol" on page 296
<code>linear-red-profile profile-name</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>linear-red-profiles profile-name</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>link-layer-overhead percent</code>	AS PIC link services IQ interfaces (lsq)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>link-mode mode</code>	Management Ethernet (fxp0 or em0) and Fast Ethernet interfaces	"Configuring the Link Characteristics" on page 109, "Understanding Management Ethernet Interfaces" on page 10

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>link-speed speed</code>	Aggregated Ethernet interfaces	"Configuring Aggregated Ethernet Link Speed" on page 106
<code>link-speed speed</code>	Aggregated SONET/SDH interfaces	<i>Configuring Aggregated SONET/SDH Interfaces</i>
<code>lmi lmi-options</code>	Interfaces with Frame Relay encapsulation	<i>Configuring Frame Relay Keepalives and Junos OS Services Interfaces Library for Routing Devices</i>
<code>lmi</code>	OAM CFM Ethernet Local Management Interface	<i>Configuring Ethernet Local Management Interface</i>
<code>lmi-type (ansi itu c-lmi)</code>	Link services interfaces and interfaces with Frame Relay encapsulation	<i>Configuring Frame Relay Keepalives</i>
<code>local-name name</code>	Interfaces with PPP encapsulation	"Configuring the PPP Challenge Handshake Authentication Protocol" on page 123
<code>lockout</code>	SONET/SDH interfaces	<i>Configuring Lockout of Protection for SDH Interfaces</i>
<code>log-prefix prefix-number</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>(long-buildout no-long-buildout)</code>	T3 interfaces	<i>Configuring the T3 Line Buildout</i>
<code>(loop-timing no-loop-timing)</code>	Channelized IQ interfaces	<i>Configuring the Channelized T3 Loop Timing</i>
<code>loopback mode</code>	DS0, E1, E3, T1, T3, SHDSL on ATM and SONET/SDH interfaces	<i>Configuring E1 Loopback Capability, Configuring E3 Loopback Capability, Configuring T1 Loopback Capability, Configuring T3 Loopback Capability, Configuring SHDSL Operating Mode on an ATM Physical Interface, Configuring SONET/SDH Loopback Capability to Identify a Problem as Internal or External, and Configuring Ethernet Loopback Capability</i>
<code>loopback mode</code>	Ethernet and 10-Gigabit Ethernet interfaces in WAN PHY mode	<i>Configuring Ethernet Loopback Capability</i>
<code>loopback mode</code>	Serial interfaces	"Configuring Serial Loopback Capability" on page 306
<code>(loopback no-loopback)</code>	Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces	<i>Configuring Ethernet Loopback Capability</i>
<code>loss-priority (high low)</code>	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>lowest-priority-defect</code> (<code>all-defects</code> <code>err-xcon</code> <code>mac-rem-err-xcon</code> <code>no-defect</code> <code>rem-err-xcon</code> <code>xcon</code>)	Configuring IEEE 802.1ag OAM connectivity-fault management	<i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i>
<code>low-plp-max-threshold percent</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>low-plp-threshold percent</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>lsq-failure-options</code>	Link services IQ (lsq) interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>mac mac-address</code>	Management Ethernet interface (<code>fxp0</code> or <code>em0</code>)	<i>Configuring the MAC Address on the Management Ethernet Interface, "Understanding Management Ethernet Interfaces" on page 10</i>
(<code>mac-learn-enable</code> <code>no-mac-learn-enable</code>)	Gigabit Ethernet IQ and IQE, Tri-Rate Ethernet copper, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
<code>master-only;</code>	Management Ethernet (<code>fxp0</code> or <code>em0</code>) and Fast Ethernet interfaces	<i>Configuring a Consistent Management IP Address, "Understanding Management Ethernet Interfaces" on page 10</i>
<code>maximum-vc</code> <code>maximum-vc</code>	ATM interfaces	<i>Configuring the Maximum Number of ATM1 VCs on a VP</i>
<code>mc-ae</code>	Aggregated Ethernet interfaces	<i>Configuring Multichassis Link Aggregation on MX Series Routers</i>
<code>minimum-links number</code>	Multilink, link services, and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>mip-half-function</code>	Connectivity Fault Management	<i>Configuring IEEE 802.3ah OAM Link-Fault Management</i>
<code>mlfr-uni-nni-bundle-options bundle-options</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>mpls</code>	10-Gigabit Ethernet interfaces in WAN PHY mode and ATM and SONET/SDH interfaces in passive monitoring mode	<i>Removing MPLS Labels from Incoming Packets, Enabling Packet Flow Monitoring on SONET/SDH Interfaces, and SONET/SDH Interfaces Overview</i>
<code>mrru bytes</code>	Link services and voice services interfaces	<i>Junos Services Interfaces Configuration Guide</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>mtu bytes</code>	All interfaces, except management Ethernet (fxp0 or em0), loopback, multilink, and multicast tunnel	<i>OBSOLETE: Configuring the Media MTU, "Understanding Management Ethernet Interfaces" on page 10</i>
<code>multicast-statistics</code>	Ethernet, SONET, aggregated Ethernet, and aggregated SONET interfaces.	<i>Configuring Multicast Statistics Collection on Aggregated Ethernet Interfaces, Configuring Multicast Statistics Collection on SONET Interfaces, Configuring Multicast Statistics Collection on Ethernet Interfaces, and Configuring Multicast Statistics Collection on Aggregated SONET Interfaces</i>
<code>multiservice-options</code>	Adaptive services, monitoring services, and collector interfaces	<i>"Configuring Multiservice Physical Interface Properties" on page 149</i>
<code>n391 number</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>n392 number</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>n393 number</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>neighbor address</code>	SONET/SDH interfaces	<i>SONET/SDH Interfaces Overview</i>
<code>no-gratuitous-arp-request</code>	Ethernet interfaces	<i>Configuring Gratuitous ARP</i>
<code>no-keepalives</code>	Interfaces with PPP, Frame Relay, or Cisco High-level Data Link Control (HDLC) encapsulation	<i>"Configuring Keepalives" on page 121</i>
<code>no-partition</code>	Channelized IQ interfaces	<i>Channelized Interfaces Overview</i>
<code>no-termination-request</code>	Link Services IQ (LSQ) interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>oam-liveness</code>	ATM interfaces	<i>Configuring the OAM F4 Cell Flows</i>
<code>oam-period (seconds disable)</code>	ATM interfaces	<i>Defining the ATM OAM F5 Loopback Cell Period</i>
<code>oc-slice oc-slice-range</code>	Channelized OC12 IQ interfaces	<i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i>
<code>open-timeout seconds</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
optics-options	Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces	<i>Ethernet DWDM Interface Wavelength Overview</i>
output-priority-map	Gigabit Ethernet IQ interfaces	<i>Configuring Gigabit Ethernet Policers</i>
overflow (discard tag) (Receive bucket)	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ interfaces	"Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion" on page 135
overflow (discard) (Transmit bucket)		
paired-group <i>group-name</i>	SONET/SDH interfaces	<i>Configuring APS Load Sharing</i>
partition <i>partition-number</i>	Channelized IQ interfaces	<i>Channelized Interfaces Overview</i>
passive	Interfaces with PPP encapsulation	"Configuring the PPP Challenge Handshake Authentication Protocol" on page 123
passive-monitor-mode	SONET/SDH interfaces	<i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i>
path-trace <i>trace-string</i>	10-Gigabit Ethernet interfaces in WAN PHY mode and SONET/SDH interfaces	<i>Configuring the SONET/SDH Path Trace Identifier for a Circuit</i>
(payload-scrambler no-payload-scrambler)	E3, SONET/SDH, and T3 interfaces	<i>Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E3 HDLC Payload Scrambling, Configuring SONET/SDH HDLC Payload Scrambling for Link Stability, and Configuring T3 HDLC Payload Scrambling</i>
periodic <i>interval</i>	Aggregated Ethernet interfaces	<i>Configuring LACP for Aggregated Ethernet Interfaces</i>
per-unit-scheduler	IQ interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
pfc	Interfaces with PPP encapsulation	"Configuring the PPP Protocol Field Compression" on page 131
pic-type (atm1 atm2)	ATM2 IQ interfaces	<i>Configuring the ATM PIC Type</i>
plp1 <i>cells</i>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
plp-to-clp	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
policer <i>cos-policer-name</i>	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
pop-all-labels	ATM and SONET/SDH interfaces in passive monitoring mode	<i>Removing MPLS Labels from Incoming Packets and Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i>
ppp-options	Interfaces with PPP encapsulation	“Configuring the PPP Challenge Handshake Authentication Protocol” on page 123
premium	Enhanced Intelligent Queuing (IQE) interfaces (hierarchical policer)	“Applying Policers” on page 203 and <i>Class of Service Feature Guide for Routing Devices</i>
premium	Gigabit Ethernet IQ interfaces (policer)	<i>Configuring Gigabit Ethernet Policers</i>
premium	Gigabit Ethernet IQ interfaces (output priority map)	<i>Configuring Gigabit Ethernet Policers</i>
primary <i>sp-fpc/pic/port</i>	Redundant interfaces for adaptive services interfaces (rsp-)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
priority (high low)	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
priority <i>number</i>	Ethernet protocols (OAM CFM)	<i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i>
promiscuous-mode	ATM2 IQ interfaces	<i>Configuring ATM Cell-Relay Promiscuous Mode</i>
protect-circuit <i>group-name</i>	SONET/SDH interfaces	<i>Configuring Switching Between the Working and Protect Circuits</i>
queue-depth <i>cells</i>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
queue-length <i>number</i>	ATM1 interfaces	<i>Configuring the ATM1 Queue Length</i>
rate <i>percentage</i>	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ	“Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion” on page 135
receive-bucket	All interfaces, except ATM, Fast Ethernet, and Gigabit Ethernet	“Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion” on page 135

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
red-differential-delay <i>milliseconds</i>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
redundancy-options	Redundant interfaces for adaptive services interfaces (rsp-)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
remote-loopback-respond	T1 interfaces	<i>Configuring the T1 Remote Loopback Response</i>
request	SONET/SDH interfaces	<i>Configuring Switching Between the Working and Protect Circuits</i>
required-depth <i>number</i>	ATM and SONET/SDH interfaces in passive monitoring mode	<i>Removing MPLS Labels from Incoming Packets and Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i>
revert-time <i>seconds</i>	SONET/SDH interfaces	<i>Configuring Revertive Mode</i>
rfc-2615	SONET/SDH interfaces	<i>Configuring PPP Support on SONET/SDH Interfaces</i>
rts (assert de-assert normal)	Serial interfaces (EIA-530 and V.35)	"Configuring the Serial Signal Handling" on page 302
rts-polarity (negative positive)	Serial interfaces (EIA-530 and V.35)	"Configuring Serial Signal Polarities" on page 305
rtvbr <i>peak rate sustained rate burst length</i>	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
scheduler-maps <i>map-name</i>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
schedulers <i>number</i>	Ethernet IQ2 and IQ2-E PICs port interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
secondary <i>sp-fpc/pic/port</i>	Redundant interfaces for adaptive services interfaces (rsp-)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
services-options	Services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
serial-options	Serial interfaces (EIA-530, V.35, and X.21)	"Serial Interfaces Overview" on page 293
services <i>priority-level</i>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
size	All	"Tracing Operations of the Interface Process" on page 312

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
shaping	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
shaping	Circuit Emulation PICs	<i>Configuring ATM QoS or Shaping</i>
sonet-options	SONET/SDH interfaces	<i>SONET/SDH Interfaces Overview</i>
source-address-filter mac-address	Aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces	<i>Configuring MAC Address Filtering for Ethernet Interfaces</i>
(source-filtering no-source-filtering)	Aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, Gigabit Ethernet IQ and IQE, and Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring MAC Address Filtering for Ethernet Interfaces</i>
speed (10m 100m 1g auto)	Management Ethernet interface (fxp0 or em0), Tri-Rate Ethernet copper interfaces, and 12-port and 48-port Fast Ethernet interfaces	“Configuring the Interface Speed on Ethernet Interfaces” on page 105 , “Understanding Management Ethernet Interfaces” on page 10
speed (oc3 oc12 oc48)	SONET/SDH PICs with SFP	“Configuring SONET/SDH Interface Speed” on page 108
spid1spid2	ISDN interfaces	<i>Configuring ISDN Physical Interface Properties and Configuring ISDN Logical Interface Properties</i>
stacked-vlan-tagging	Gigabit Ethernet IQ interfaces	<i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>
start-end-flag (filler shared)	DS0, E1, E3, T1, and T3 interfaces	<i>Configuring E1 Start and End Flags, Configuring the E3 Start and End Flags, Configuring T1 Start and End Flags, and Configuring T3 Start and End Flags</i>
switching-mode (bidirectional unidirectional)	Unchannelized OC3, OC12, and OC48 SONET/SDH interfaces on T Series routers	<i>Configuring Switching Mode</i>
syslog	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
(syslog no-syslog)	Adaptive services, monitoring services, and collector interfaces	“Configuring Multiservice Physical Interface Properties” on page 149
t1-options	T1 interfaces	<i>T1 Interfaces Overview</i>
t3-options	T3 interfaces	<i>T3 Interfaces Overview</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
t310	ISDN interfaces	<i>Configuring ISDN Physical Interface Properties</i>
t391 seconds	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
t392 number	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
tei-option (first-call power-up)	ISDN interfaces	<i>Configuring ISDN Physical Interface Properties</i>
threshold bytes	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ	“Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion” on page 135
timeslots time-slot-range	Channelized T1 IQ and channelized E1 IQ interfaces	<i>Channelized Interfaces Overview</i>
tm (ignore normal require)	Serial interfaces (EIA-530)	“Configuring the Serial Signal Handling” on page 302
tm-polarity (negative positive)	Serial interfaces (EIA-530)	“Configuring Serial Signal Polarities” on page 305
traceoptions	All	“Tracing Operations of an Individual Router Interface” on page 311
traceoptions	All	“Tracing Operations of the Interface Process” on page 312
transmit-bucket	All interfaces, except ATM, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet	“Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion” on page 135
transmit-clock invert	Serial interfaces (EIA-530, V.35, and X.21)	“Configuring the Serial Clocking Mode” on page 300
transmit-weight (cells <i>number</i> percent <i>number</i>)	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
(traps no-traps)	All	“Enabling or Disabling SNMP Notifications on Physical Interfaces” on page 150
trigger defect ignore defect hold-time up <i>milliseconds</i> down <i>milliseconds</i> ;	10-Gigabit Ethernet interfaces in WAN PHY mode and ATM over SONET/SDH and SONET/SDH interfaces	<i>Configuring SONET/SDH Defect Triggers</i>
(unframed no-unframed)	E3 IQ interfaces	<i>Configuring E3 IQ and IQE Unframed Mode</i>

Table 29: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>unidirectional</code>	10-Gigabit Ethernet interfaces on: <ul style="list-style-type: none"> MX960 4-Port 10-Gigabit Ethernet DPC T Series 10-Gigabit Ethernet IQ2 PIC T Series 10-Gigabit Ethernet IQ2E PIC 	“Enabling Unidirectional Traffic Flow on Physical Interfaces” on page 138
<code>vbr peak rate sustained rate burst length</code>	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
<code>vc-cos-mode (alternate strict)</code>	ATM2 interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>vlan-tagging</code>	Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces	<i>802.1Q VLANs Overview</i>
<code>vlan-vci-tagging</code>	Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet interfaces	“Configuring ATM-to-Ethernet Interworking” on page 254
<code>vpi vpi-identifier</code>	ATM interfaces	<i>Configuring ATM Cell-Relay Promiscuous Mode and Configuring the Maximum Number of ATM1 VCs on a VP</i>
<code>vtmapping</code>	Channelized STM1 interfaces	<i>Configuring Channelized STM1 Interfaces</i>
<code>warning warning-name (syslog link-down)</code>	10-Gigabit Ethernet interfaces	<i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i>
<code>wavelength nm</code>	Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces	<i>Ethernet DWDM Interface Wavelength Overview</i>
<code>working-circuit group-name</code>	SONET/SDH interfaces	<i>Configuring Switching Between the Working and Protect Circuits</i>
<code>yellow-differential-delay milliseconds</code>	Link services and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>(z0-increment no-z0-increment)</code>	SONET/SDH interfaces	<i>Configuring an Incrementing STM ID to Interoperate with Older Equipment in SDH Mode</i>

Related Documentation • [Junos OS Services Interfaces Library for Routing Devices](#)

Interface Ranges



NOTE: This task uses Junos OS for EX Series switches that does not support the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that supports ELS, see *Configuring Interface Ranges*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

The Junos OS allows you to group a range of identical interfaces into an *interface range*. You first specify the group of identical interfaces in the interface range. Then you can apply a common configuration to the specified interface range, reducing the number of configuration statements required and saving time while producing a compact configuration.

- [Configuring Interface Ranges on page 84](#)
- [Expanding Interface Range Member and Member Range Statements on page 88](#)
- [Configuration Inheritance for Member Interfaces on page 89](#)
- [Member Interfaces Inheriting Configuration from Configuration Groups on page 90](#)
- [Interfaces Inheriting Common Configuration on page 91](#)
- [Configuring Inheritance Range Priorities on page 91](#)
- [Configuration Expansion Where Interface Range Is Used on page 92](#)

Configuring Interface Ranges

To configure an interface range, include the **interface-range** statement at the **[edit interfaces]** hierarchy level.

The **interface-range** statement accepts only physical networking interface names in its definition. The following interface types are supported and example CLI descriptors are shown:

- ATM—**at-*fpc/pic/port***
- Channelized—**(coc | cstm)*n-fpc/pic/port***
- DPC—**xe-*fpc/pic/port***
- E1/E3—**(e1 | e3)-*fpc/pic/port***
- Ethernet—**(xe | ge | fe)-*fpc/pic/port***
- ISDN—**isdn-*fpc/pic/port***
- Serial—**se-*fpc/pic/port***
- SONET/SDH—**so-*fpc/pic/port***
- T1/T3—**(t1 | t3)-*fpc/pic/port***

Interfaces can be grouped either as a range of interfaces or using a number range under the **interface-range** statement definition.

Interfaces in an **interface-range** definition can be added as part of a member range or as individual members or multiple members using a number range.

To specify a member range, use the **member-range** statement at the **[edit interfaces interface-range name]** hierarchy level.

To specify interfaces in lexical order, use the **member-range start-range to end-range** statement.

A range for a member statement should contain the following:

- *****—All, specifies sequential interfaces from 0 through 47.



CAUTION: The wildcard ***** in a member statement does not take into account the interface numbers supported by a specific interface type. Irrespective of the interface type, ***** includes interface numbers ranging from 0 through 47 to the interface group. Therefore, use ***** in a member statement with caution.

- **num**—Number, specifies one specific interface by its number.
- **[low-high]**—Numbers between low to high, specifies a range of sequential interfaces.
- **[num1, num2, num3]**—Numbers **num1**, **num2**, and **num3** specify multiple specific interfaces.

Example: Specifying an Interface Range Member Range

```
member-range ge-0/0/0 to ge-4/0/40;
```

To specify one or multiple members, use the **member** statement at the **[edit interfaces interface-range name]** hierarchy level.

To specify the list of interface range members individually or for multiple interfaces using regex, use the **member list of interface names** statement.

Example: Specifying an Interface Range Member

```
member ge-0/0/0;
member ge-0/*/*
member ge-0/[1-10]/0;
member ge-0/[1,2,3]/3;
```

Regex or wildcards are not supported for interface-type prefixes. For example, prefixes **ge**, **fe**, and **xe** must be mentioned explicitly.

An **interface-range** definition can contain both **member** and **member-range** statements within it. There is no maximum limit on the number of **member** or **member-range** statements within an interface-range. However, at least one **member** or **member-range** statement must exist within an **interface-range** definition.

Example: Interface Range Common Configuration

Configuration common to an interface range can be added as a part of the **interface-range** definition, as follows:

```
[edit]
interfaces {
```

```

+ interface-range foo {
+ member-range ge-1/0/0 to ge-4/0/40;
+ member ge-0/1/1;
+ member ge-5/[1-10]/*;
  /*Common configuration is added as part of interface-range definition*/
  mtu 256;
  hold-time up 10;
  ether-options {
    flow-control;
    speed {
      100m;
    }
    802.3ad primary;
  }
}
}

```

An **interface-range** definition having just **member** or **member-range** statements and no common configurations statements is valid.

These defined interface ranges can be used in other configuration hierarchies, in places where an **interface** node exists.

Example:
Interface-Range foo
Used Under the
Protocols Hierarchy

```

protocols {
  dot1x {
    authenticator {
      interface foo{
        retries 1;
      }
    }
  }
}
}

```

foo should be an **interface-range** defined at the **[interfaces]** hierarchy level. In the above example, the **interface** node can accept both individual interfaces and interface ranges.



TIP: To view an interface range in expanded configuration, use the (**show | display inheritance**) command. For more information, see the *CLI User Guide*.

By default, **interface-range** is not available to configure in the CLI where the **interface** statement is available. The following locations are supported; however, some of the hierarchies shown in this list are product specific:

- protocols dot1x authentication interface
- protocols dvmrp interface
- protocols oam ethernet lmi interface
- protocols esis interface
- protocols igmp interface
- protocols igmp-host client *num* interface

- protocols mld-host client *num* interface
- protocols router-advertisement interface
- protocols isis interface
- protocols ldp interface
- protocols oam ethernet link-fault-management interface
- protocols lldp interface
- protocols link-management peer lmp-control-channel interface
- protocols link-management peer control-channel
- protocols link-management te-link *name* interface
- protocols mld interface
- protocols ospf area *id* interface
- protocols pim interface
- protocols router-discovery interface
- protocols rip group *name* neighbour
- protocols ripng group *name* neighbour
- protocols rsvp interface
- protocols snmp interface
- protocols layer2-control bpdu-block interface
- protocols layer2-control mac-rewrite interface
- protocols mpls interface
- protocols stp interface
- protocols rstp interface
- protocols mstp interface
- protocols vstp interface
- protocols mstp msti *id* interface
- protocols mstp msti vlan *id* interface
- protocols vstp vlan *name* interface
- protocols gvrp interface
- protocols igmp-snooping vlan *name* interface
- protocols lldp interface
- protocols lldp-med interface
- protocols sflow interfaces
- ethernet-switching-options analyzer *name* input [egress | ingress] interface

- ethernet-switching-options analyzer *name* output interface
- ethernet-switching-options secure-access-port interface
- ethernet-switching-options interfaces ethernet-switching-options voip interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options bpdu-block interface
- poe interface vlans pro-bng-mc1-bsd1 interface

Expanding Interface Range Member and Member Range Statements

All **member** and **member-range** statements in an interface range definition are expanded to generate the final list of interface names for the specified interface range.

Example: Expanding Interface Range Member and Member Range Statements

```
[edit]
interfaces {
  interface-range range-1 {
    member-range ge-0/0/0 to ge-4/0/20;
    member ge-10/1/1;
    member ge-5/[0-5]/*;
    /*Common configuration is added part of the interface-range definition*/
    mtu 256;
    hold-time up 10;
    ether-options {
      flow-control;
      speed {
        100m;
      }
      802.3ad primary;
    }
  }
}
```

For the **member-range** statement, all possible interfaces between **start-range** and **end-range** are considered in expanding the members. For example, the following **member-range** statement:

member-range ge-0/0/0 to ge-4/0/20

expands to:

```
[ge-0/0/0, ge-0/0/1 ... ge-0/0/max_ports
ge-0/1/0 ge-0/1/1 ... ge-0/1/max_ports
ge-0/2/0 ge-0/2/1 ... ge-0/2/max_ports
.
.
ge-0/MAX_PICS/0 ... ge-0/max_pics/max_ports
ge-1/0/0 ge-1/0/1 ... ge-1/0/max_ports
.
ge-1/MAX_PICS/0 ... ge-1/max_pics/max_ports
.
.
ge-4/0/0 ge-4/0/1 ... ge-4/0/max_ports]
```

The following **member** statement:

```
ge-5/[0-5]/*
```

expands to:

```
ge-5/0/0 ... ge-5/0/max_ports
ge-5/1/0 ... ge-5/0/max_ports
.
.
ge-5/5/0 ... ge-5/5/max_ports
```

The following **member** statement:

```
ge-5/1/[2,3,6,10]
```

expands to:

```
ge-5/1/2
ge-5/1/3
ge-5/1/6
ge-5/1/10
```

Configuration Inheritance for Member Interfaces

When the Junos OS expands the **member** and **member-range** statements present in an **interface-range**, it creates *interface objects* if they are not explicitly defined in the configuration. The common configuration is copied to all its member interfaces in the **interface-range**.

Example: Foreground interface configuration takes priority compared to configuration inherited by the interface through the **interface-range**.

```
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0/ to ge-10/0/47;
    mtu 256;
  }
  ge-1/0/1 {
    mtu 1024;
  }
}
```

In the preceding example, interface **ge-1/0/1** will have an MTU value of 1024.

This can be verified with output of the **show interfaces | display inheritance** command, as follows:

```
user@host: # show interfaces | display inheritance
## 'ge-1/0/0' was expanded from interface-range 'range-1'
##
ge-1/0/0 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
ge-1/0/1 {
  mtu 1024;
```

```
}
##
## 'ge-1/0/2' was expanded from interface-range 'range-1'
##
ge-1/0/2 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}

.....
.....
##
## 'ge-10/0/47' was expanded from interface-range 'range-1'
##
ge-10/0/47 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
```

Member Interfaces Inheriting Configuration from Configuration Groups

Interface range member interfaces inherit the config-groups configuration like any other foreground configuration. **interface-range** is similar to any other foreground configuration statement. The only difference is that the **interface-range** goes through a member interfaces expansion before Junos OS reads this configuration.

```
groups {
  global {
    interfaces {
      <*> {
        hold-time up 10;
      }
    }
  }
  apply-groups [global];
  interfaces {
    interface-range range-1 {
      member-range ge-1/0/0 to ge-10/0/47;
      mtu 256;
    }
  }
}
```

The **hold-time** configuration is applied to all members of **interface-range range-1**.

This can be verified with **show interfaces | display inheritance** as follows:

```
user@host# show interfaces | display inheritance
ge-1/0/0 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
  ##
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
```

```

    ##
    hold-time up 10;
}
ge-1/0/1 {
    ##
    ## '256' was expanded from interface-range 'range-1'
    ##
    mtu 256;
    ##
    ## 'hold-time' was inherited from group 'global'
    ## '10' was inherited from group 'global'
    ##
    hold-time up 10;
}
ge-10/0/47 {
    ##
    ## '256' was expanded from interface-range 'range-1'
    ##
    mtu 256;
    ##
    ## 'hold-time' was inherited from group 'global'
    ## '10' was inherited from group 'global'
    ##
    hold-time up 10;
}

```

Interfaces Inheriting Common Configuration

If an interface is a member of several interface ranges, that interface will inherit the common configuration from all of those interface ranges.

```

[edit]
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0 to ge-10/0/47;
    mtu 256;
  }
}
interfaces {
  interface-range range-1 {
    member-range ge-10/0/0 to ge-10/0/47;
    hold-time up 10;
  }
}

```

In this example, interfaces **ge-10/0/0** through **ge-10/0/47** will have both **hold-time** and **mtu**.

Configuring Inheritance Range Priorities

The interface ranges are defined in the order of inheritance priority, with the first interface range configuration data taking priority over subsequent interface ranges.

```

[edit]
interfaces {
  interface-range int-grp-one {
    member-range ge-0/0/0 to ge-4/0/40;
    member ge-1/1/1;
  }
}

```

```
/*Common config is added part of the interface-range definition*/
mtu 256;
hold-time up 10;
}
}
interfaces {
  interface-range int-grp-two {
    member-range ge-5/0/0 to ge-10/0/40;
    member ge-1/1/1;
    mtu 1024;
  }
}
```

Interface **ge-1/1/1** exists in both **interface-range *int-grp-one*** and **interface-range *int-grp-two***. This interface inherits **mtu 256** from **interface-range *int-grp-one*** because it was defined first.

Configuration Expansion Where Interface Range Is Used

In this example, **interface-range *range-1*** is used under the **protocols** hierarchy:

```
[edit]
interfaces {
  interface-range range-1 {
    member ge-10/1/1;
    member ge-5/5/1;
    mtu 256;
    hold-time up 10;
    ether-options {
      flow-control;
      speed {
        100m;
      }
      802.3ad primary;
    }
  }
}
protocols {
  dot1x {
    authenticator {
      interface range-1 {
        retries 1;
      }
    }
  }
}
}
```

The **interface** node present under **authenticator** is expanded into member interfaces of the **interface-range *range-1*** as follows:

```
protocols {
  dot1x {
    authenticator {
      interface ge-10/1/1 {
        retries 1;
      }
      interface ge-5/5/1 {
```

```

        retries 1;
    }
}
}

```

The **interface range-1** statement is expanded into two interfaces, ge-10/1/1 and ge-5/5/1, and configuration **retries 1** is copied under those two interfaces.

This configuration can be verified using the **show protocols dot1x | display inheritance** command.

Related Documentation

- *Physical Interfaces*

Specifying an Aggregated Interface

The M Series, MX Series, and T Series routers support aggregated interfaces. To specify an aggregated interface assign a number with the aggregated interface name. For example, configure **aex** at the **[edit interfaces]** hierarchy level, where *x* is an integer ranging 0 through 127 for M Series and T Series routers and 0 through 479 on MX Series routers.

For aggregated SONET/SDH interfaces, configure **asx** at the **[edit interfaces]** hierarchy level.



NOTE: SONET/SDH aggregation is proprietary to the Junos OS and might not work with other software.

If you are configuring VLANs for aggregated Ethernet interfaces, you must include the **vlan-tagging** statement at the **[edit interfaces aex]** hierarchy level to complete the association.

Related Documentation

- *Aggregated Ethernet Interfaces Overview*
- *Configuring Aggregated SONET/SDH Interfaces*

Media MTU Overview

The media maximum transmission unit (MTU) is the largest data unit that can be forwarded without fragmentation.

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO).

The default media MTU is calculated as follows:

Default media MTU = Default IP MTU + encapsulation overhead

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size.



NOTE: The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

The physical MTU for Ethernet interfaces does not include the 4-byte frame check sequence (FCS) field of the Ethernet frame.

A SONET/SDH interface operating in concatenated mode has a “c” added to the rate descriptor. For example, a concatenated OC48 interface is referred to as OC48c.

If you do not configure an MPLS MTU, the Junos OS derives the MPLS MTU from the physical interface MTU. From this value, the software subtracts the encapsulation-specific overhead and space for the maximum number of labels that might be pushed in the Packet Forwarding Engine. Currently, the software provides for three labels of four bytes each, for a total of 12 bytes.

In other words, the formula used to determine the MPLS MTU is the following:

$$\text{MPLS MTU} = \text{physical interface MTU} - \text{encapsulation overhead} - 12$$

**Related
Documentation**

- [Configuring the Media MTU on page 104](#)
- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)
- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)

Media MTU Sizes by Interface Type

The media maximum transmission unit (MTU) is the largest data unit that can be forwarded without fragmentation.

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead.

This topic includes following information:

- [Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers on page 95](#)
- [Media MTU Sizes by Interface Type for M40e Routers on page 96](#)
- [Media MTU Sizes by Interface Type for M160 Routers on page 97](#)
- [Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers on page 97](#)

- [Media MTU Sizes by Interface Type for MX Series Routers on page 98](#)
- [Media MTU Sizes by Interface Type for T320 Routers on page 99](#)
- [Media MTU Sizes by Interface Type for T640 Platforms on page 99](#)
- [Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers on page 100](#)
- [Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers on page 100](#)

Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers

Table 30: Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	9192	1500
E3/T3	4474	9192	4470
Fast Ethernet	1514	1533 (4-port) 1532 (8-port) 1532 (12-port) <i>NOTE:</i> The maximum MTU for two 100Base-TX Fast Ethernet port FIC is 9192 bytes.	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192 <i>NOTE:</i> The maximum MTU for one Gigabit Ethernet port FIC is 9192 bytes.	1500 (IPv4), 1497 (ISO)
Serial	1504	9192	1500 (IPv4), 1497 (ISO)
SONET/SDH	4474	9192	4470

Media MTU Sizes by Interface Type for M40e Routers

Table 31: Media MTU Sizes by Interface Type for M40e Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	4500	1500
E3/T3	4474	4500 9192 (4-port)	4470
E3/DS3 IQ	4474	9192	4470
Fast Ethernet	1514	1533	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192 (1- or 2-port) 9192 (4-port)	1500 (IPv4), 1497 (ISO)
Serial	1504	9192	1500 (IPv4), 1497 (ISO)
SONET/SDH	4474	4500 (1-port nonconcatenated) 9192 (4-port OC3) 9192 (4-port OC3c) 4500 (1-port OC12) 4500 (4-port OC12) 4500 (4-port OC12c) 4500 (1-port OC48) 9192 (2-port OC3) 9192 (2-port OC3c) 9192 (1-port OC12c) 9192 (1-port OC48c) 4500 (1-port OC192) 9192 (1-port OC192c)	4470

Media MTU Sizes by Interface Type for M160 Routers

Table 32: Media MTU Sizes by Interface Type for M160 Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	4500	1500
E3/T3	4474	4500	4470
E3/DS3 IQ	4474	9192	4470
Fast Ethernet	1514	1533	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192 (1- or 2-port) 4500 (4-port)	1500 (IPv4), 1497 (ISO)
Serial	1504	9192	1500 (IPv4), 1497 (ISO)
SONET/SDH	4474	4500 (1-port nonconcatenated) 9192 (1- or 2-port) 4500 (4-port)	4470

Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers

Table 33: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM2 IQ	4482	9192	4470
Channelized DS3 IQ	4471	4500	4470
Channelized E1 IQ	1504	4500	1500
Channelized OC12 IQ	4474	9192	4470

Table 33: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Channelized STM1 IQ	4474	9192	4470
DS3	4471	4500	4470
E1	1504	4500	1500
E3 IQ	4471	4500	4470
Fast Ethernet	1514	1533 (4-port) 1532 (8-, 12- and 48-port)	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)
SONET/SDH	4474	9192	4470
T1	1504	4500	1500
CT3 IQ (excluding M120)	4474	9192	4470

Media MTU Sizes by Interface Type for MX Series Routers**Table 34: Media MTU Sizes by Interface Type for MX Series Routers**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
10-Gigabit Ethernet	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
Multi-Rate Ethernet	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
Tri-Rate Ethernet	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)

Table 34: Media MTU Sizes by Interface Type for MX Series Routers (*continued*)

Channelized SONET/SDH OC3/STM1 (Multi-Rate)	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
DS3/E3 (Multi-Rate)	1514	9192	1500 (IPv4), 1488 (MPLS), 1497 (ISO)

Media MTU Sizes by Interface Type for T320 Routers**Table 35: Media MTU Sizes by Interface Type for T320 Routers**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM	4482	9192	4470
ATM2 IQ	4482	9192	4470
Channelized OC12 IQ	4474	9192	4470
Channelized STM1 IQ	4474	9192	4470
DS3	4471	4500	4470
Fast Ethernet	1514	1533 (4-port) 1532 (12- and 48-port)	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)
SONET/SDH	4474	9192	4470
CT3 IQ	4474	9192	4470

Media MTU Sizes by Interface Type for T640 Platforms**Table 36: Media MTU Sizes by Interface Type for T640 Platforms**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM2 IQ	4482	9192	4470
48-port Fast Ethernet	1514	1532	1500 (IPv4), 1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)

Table 36: Media MTU Sizes by Interface Type for T640 Platforms (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
SONET/SDH	4474	9192	4470
CT3 IQ	4474	9192	4470

Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers

Table 37: Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)
10-Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)



NOTE: On ACX Series routers, you can configure the protocol MTU by including the `mtu` statement at the `[edit interfaces interface-name unit logical-unit-number family inet]` or `[edit interfaces interface-name unit logical-unit-number family inet6]` hierarchy level.

- If you configure the protocol MTU at any of these hierarchy levels, the configured value is applied to all families that are configured on the logical interface.
- If you are configuring the protocol MTU for both `inet` and `inet6` families on the same logical interface, you must configure the same value for both the families. It is not recommended to configure different MTU size values for `inet` and `inet6` families that are configured on the same logical interface.

Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers

Table 38: Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
10-Gigabit Ethernet	1514	9500	1500 (IPv4), 1488 (MPLS), 1497 (ISO)

Table 38: Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
40-Gigabit Ethernet	1514	9500	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
100-Gigabit Ethernet	1514	9500	1500 (IPv4), 1488 (MPLS), 1497 (ISO)

Related Documentation

- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)
- [Configuring the Media MTU on page 104](#)
- [Media MTU Overview on page 93](#)
- [Setting the Protocol MTU on page 201](#)

Encapsulation Overhead by Interface Encapsulation Type

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. The following table lists the interface encapsulation and corresponding encapsulation overhead.

Table 39: Encapsulation Overhead by Encapsulation Type

Interface Encapsulation	Encapsulation Overhead (Bytes)
802.1Q/Ethernet 802.3	21
802.1Q/Ethernet Subnetwork Access Protocol (SNAP)	26
802.1Q/Ethernet version 2	18
ATM Cell Relay	4
ATM permanent virtual connection (PVC)	12
Cisco HDLC	4
Ethernet 802.3	17
Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS)	4
Ethernet over ATM	32
Ethernet SNAP	22

Table 39: Encapsulation Overhead by Encapsulation Type (*continued*)

Interface Encapsulation	Encapsulation Overhead (Bytes)
Ethernet translational cross-connect (TCC)	18
Ethernet version 2	14
Extended virtual local area network (VLAN) CCC and VPLS	4
Extended VLAN TCC	22
Frame Relay	4
PPP	4
VLAN CCC	4
VLAN VPLS	4
VLAN TCC	22

Related Documentation

- [Media MTU Overview on page 93](#)
- [Configuring the Media MTU on page 104](#)
- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)
- [Setting the Protocol MTU on page 201](#)

Configuring Interface Description

You can include a text description of each physical interface in the configuration file. Any descriptive text you include is displayed in the output of the **show interfaces** commands, and is also exposed in the **ifAlias** Management Information Base (MIB) object. It has no impact on the interface's configuration.

Before you add a text description of a physical interface in the configuration file, you must first configure the interface at the **[edit interfaces]** hierarchy level. To add a text description, include the **description** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
description text
```

For example:

```
[edit interfaces fe-0/0/1]
description "Backbone connection to PHL01"
```


The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.



NOTE: You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See *Using DHCP Relay Agent Option 82 Information in the Junos OS Broadband Subscriber Management and Services Library*.

For information about describing logical units, see [“Adding a Logical Unit Description to the Configuration” on page 168](#).

To display the description from the router or switch CLI, use the **show interfaces** command:

```
user@host>
show interfaces fe-0/0/1
Physical interface: fe-0/0/1, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 23
  Description: Backbone connection to PHL01
  ...
```

To display the interface description from the interfaces MIB, use the **snmpwalk** command from a server. To isolate information for a specific interface, search for the interface index shown in the **SNMP ifIndex** field of the **show interfaces** command output. The **ifAlias** object is in **ifXTable**.

```
user-server>snmpwalk host-fxp0.mylab public ifXTable | grep -e '\.23'
snmpwalk host-fxp0.mylab public ifXTable | grep -e '\.23'
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifName.23 = fe-0/0/1
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInOctets.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInBroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOctets.23 = Counter64: 42
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOUmulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOUbroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifLinkUpDownTrapEnable.23 = enabled(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHighSpeed.23 = Gauge32: 100
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifPromiscuousMode.23 = false(2)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifConnectorPresent.23 = true(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifAlias.23 = Backbone connection to PHL01
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifCounterDiscontinuityTime.23 = Timeticks:
(0) 0:00:00.00
```

Related Documentation

- [Using DHCP Relay Agent Option 82 Information](#)
- [Adding a Logical Unit Description to the Configuration on page 168](#)

Configuring the Media MTU

The media maximum transmission unit (MTU) is the largest data unit that can be forwarded without fragmentation. The default media MTU size used on a physical interface depends on the encapsulation being used on that interface. For a listing of MTU sizes for each encapsulation type, see [“Media MTU Sizes by Interface Type” on page 94](#).

To configure the media-MTU size:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# [edit interfaces interface-name]
```

2. Include the **mtu** statement.

```
[edit interfaces interface-name]
mtu bytes;
```

- If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. You configure the protocol MTU by including the **mtu** statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* family *family*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]**



NOTE:

- Changing the media MTU or protocol MTU causes an interface to be deleted and added again.
 - Because tunnel services interfaces are considered logical interfaces, you cannot configure the MTU setting for the physical interface. This means you cannot include the **mtu** statement at the **[edit interfaces *interface-name*]** hierarchy level for the following interface types: generic routing encapsulation (gr-), IP-IP (ip-), loopback (lo-), link services (ls-), multilink services (ml-), and multicast (pe-, pd-). You can, however, configure the protocol MTU on tunnel interfaces.
 - If you configure an MTU value by including the **mtu** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* family mpls]** hierarchy level, the configured value is used.
-

Related Documentation

- [Media MTU Overview on page 93](#)
- [Media MTU Sizes by Interface Type on page 94](#)
- [Encapsulation Overhead by Interface Encapsulation Type on page 101](#)
- [Setting the Protocol MTU on page 201](#)

Configuring the Interface Speed

You can configure the interface speed in following ways:

- [Configuring the Interface Speed on Ethernet Interfaces on page 105](#)
- [Configuring Aggregated Ethernet Link Speed on page 106](#)
- [Configuring SONET/SDH Interface Speed on page 108](#)

Configuring the Interface Speed on Ethernet Interfaces

For M Series and T Series Fast Ethernet 12-port and 48-port PIC interfaces, the management Ethernet interface (**fxp0** or **em0**), and the MX Series Tri-Rate Ethernet copper interfaces, you can explicitly set the interface speed. The Fast Ethernet, **fxp0**, and **em0** interfaces can be configured for 10 Mbps or 100 Mbps (**10m** | **100m**). The MX Series Tri-Rate Ethernet copper interfaces can be configured for 10 Mbps, 100 Mbps, or 1 Gbps (**10m** | **100m** | **1g**). For information about management Ethernet interfaces and to determine the management Ethernet interface type for your router, see “[Understanding Management Ethernet Interfaces](#)” on page 10 and “[Supported Routing Engines by Router](#)” on page 14. MX Series routers, with MX-DPC and Tri-Rate Copper SFPs, support 20x1 Copper to provide backwards compatibility with 100/10BASE-T and 1000BASE-T operation through an Serial Gigabit Media Independent Interface (SGMII) interface.

1. In configuration mode, go to the **[edit interfaces interface-name]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. To configure the speed, include the **speed** statement at the **[edit interfaces interface-name]** hierarchy level.

```
[edit interfaces interface-name]
user@host# set speed (10m | 100m | 1g);
```



NOTE:

- By default, the M Series and T Series routers management Ethernet interface autonegotiates whether to operate at 10 megabits per second (Mbps) or 100 Mbps. All other interfaces automatically choose the correct speed based on the PIC type and whether the PIC is configured to operate in multiplexed mode (using the `no-concatenate` statement in the `[edit chassis]` configuration hierarchy.
 - When you manually configure Fast Ethernet interfaces on the M Series and T Series routers, link mode and speed must both be configured. If both these values are not configured, the router uses autonegotiation for the link and ignores the user-configured settings.
 - If the link partner does not support autonegotiation, configure either Fast Ethernet port manually to match its link partner's speed and link mode. When the link mode is configured, autonegotiation is disabled.
 - On MX Series routers with tri-rate copper SFP interfaces, if the port speed is negotiated to the configured value and the negotiated speed and interface speed do not match, the link will not be brought up.
 - When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.
 - Half-duplex mode is not supported on Tri-Rate Ethernet copper interfaces. When you include the `speed` statement, you must include the `link-mode full-duplex` statement at the same hierarchy level.
-

Configuring Aggregated Ethernet Link Speed

On aggregated Ethernet interfaces, you can set the required link speed for all interfaces included in the bundle. Generally, all interfaces that make up a bundle must have the same speed. If you include in the aggregated Ethernet interface an individual link that has a speed different from the speed that you specify in the `link-speed` parameter, an error message is logged. However, starting with Junos OS Release 13.2, aggregated Ethernet supports the following mixed rates and mixed modes on T640, T1600, T4000, and TX Matrix Plus routers:

- Member links of different modes (WAN and LAN) for 10-Gigabit Ethernet links.
- Member links of different rates: 10-Gigabit Ethernet, 40-Gigabit Ethernet, 50-Gigabit Ethernet, 100-Gigabit Ethernet, and OC192 (10-Gigabit Ethernet WAN mode)

Starting with Junos OS Release 14.2, aggregated Ethernet supports mixed link speeds on PTX Series Packet Transport Routers.

**NOTE:**

- Member links of 50-Gigabit Ethernet can only be configured using the 50-Gigabit Ethernet interfaces of 100-Gigabit Ethernet PIC with CFP (PD-1CE-CFP-FPC4).
- Starting with Junos OS Release 13.2, 100-Gigabit Ethernet member links can be configured using the two 50-Gigabit Ethernet interfaces of 100-Gigabit Ethernet PIC with CFP. This 100-Gigabit Ethernet member link can be included in an aggregated Ethernet link that includes member links of other interfaces as well. In releases before Junos OS Release 13.2, the 100-Gigabit Ethernet member link configured using the two 50-Gigabit Ethernet interfaces of 100-Gigabit Ethernet PIC with CFP cannot be included in an aggregated Ethernet link that includes member links of other interfaces.

To configure member links of mixed rates and mixed modes on T640, T1600, T4000, TX Matrix Plus, and PTX routers, you need to configure the **mixed** option for the `[edit interfaces aex aggregated-ether-options link-speed]` statement.

To set the required link speed:

1. Specify that you want to configure the aggregated Ethernet options.

```
user@host# edit interfaces interface-name aggregated-ether-options
```

2. Configure the link speed.

```
[edit interfaces interface-name aggregated-ether-options ]
user@host# set link-speed speed
```

speed can be in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation **k** (1000), **m** (1,000,000), or **g** (1,000,000,000).

Aggregated Ethernet interfaces on the M120 router can have one of the following speeds:

- **100m**—Links are 100 Mbps.
- **10g**—Links are 10 Gbps.
- **1g**—Links are 1 Gbps.
- **oc192**—Links are OC192 or STM64c.

Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speeds:

- **10m**—Links are 10 Mbps.
- **100m**—Links are 100 Mbps.
- **1g**—Links are 1 Gbps.

- **10g**—Links are 10 Gbps.
- **50g**—Links are 50 Gbps.

Aggregated Ethernet links on T Series routers can be configured to operate at one of the following speeds:

- **100g**—Links are 100 Gbps.
- **100m**—Links are 100 Mbps.
- **10g**—Links are 10 Gbps.
- **1g**—Links are 1 Gbps.
- **40g**—Links are 40 Gbps.
- **50g**—Links are 50 Gbps.
- **80g**—Links are 80 Gbps.
- **8g**—Links are 8 Gbps.
- **mixed**—Links are of various speeds.
- **oc192**—Links are OC192.

Configuring SONET/SDH Interface Speed

To configure the speed of SONET/SDH interfaces in concatenated mode:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level, where the *interface-name* is ***so-fpc/pic/port***.

```
[edit]
user@host# edit interfaces so-fpc/pic/port
```

2. Configure interface speed in concatenated mode.

For example, each port of 4-port OC12 PIC can be configured to be in OC3 or OC12 speed independently when this PIC is in 4xOC12 concatenated mode.

```
[edit interfaces so-fpc/pic/port]
user@host# set speed (oc3 | oc12 | oc48)
```

To configure the speed of SONET/SDH interfaces in nonconcatenated mode:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level, where the *interface-name* is ***so-fpc/pic/port***.

```
[edit]
user@host# edit interfaces so-fpc/pic/port
```

2. Configure interface speed in nonconcatenated mode.

For example, each port of 4-port OC12 PIC can be configured to be in OC3 or OC12 speed independently when this PIC is in 4xOC12 concatenated mode.

```
[edit interfaces so-fpc/pic/port]
user@host# set speed (oc3 | oc12)
```

To configure the PIC to operate in channelized (multiplexed) mode:

1. In configuration mode, go to the `[edit chassis fpc slot-number pic pic-number]` hierarchy level.

```
[edit]
user@host# [edit chassis fpc slot-number pic pic-number]
```

2. Configure the `no-concatenate` option.

```
[edit interfaces so-fpc/pic/port]
user@host# set no-concatenate
```



NOTE: On SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, and Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP, you cannot set the interface speed at the `[edit interfaces]` hierarchy level. To enable the speed on these MICs, you need to set the port speed at the `[edit chassis fpc slot-number pic pic-number port port-number]` hierarchy level.

For more information about using the `non-concatenate` statement, see the *Junos OS Administration Library for Routing Devices*.

Related •
Documentation

Configuring the Link Characteristics

By default, the router's management Ethernet interface, `fxp0` or `em0`, autonegotiates whether to operate in full-duplex or half-duplex mode. Fast Ethernet interfaces can operate in either full-duplex or half-duplex mode, and all other interfaces can operate only in full-duplex mode. For Gigabit Ethernet, the link partner must also be set to full duplex.



NOTE: When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.



NOTE: When you manually configure Fast Ethernet interfaces on the M Series and T Series routers, link mode and speed must both be configured. If both these values are not configured, the router uses autonegotiation for the link and ignores the user-configured settings.



NOTE: When the Fast Ethernet interface on Juniper Networks routers with autonegotiation enabled interoperates with a device configured to operate in half-duplex mode (autonegotiation disabled), the interface defaults to half-duplex mode after the PIC is taken offline and brought back online. This results in packet loss and cyclic redundancy check (CRC) errors.

To explicitly configure an Ethernet interface to operate in either full-duplex or half-duplex mode, include the **link-mode** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
link-mode (full-duplex | half-duplex);
```

Interface Alias Names Overview

You can configure a textual description of a logical unit on a physical interface to be the alias of an interface name. Interface aliasing is supported only at the unit level. If you configure an alias name, the alias name is displayed instead of the interface name in the output of all **show**, **show interfaces**, and other operational mode commands. In Junos OS Release 12.3R8 and later, display of the alias can be suppressed in favor of the actual interface name by using the **display no-interface-alias** parameter along with the **show** command. Configuring an alias for a logical unit of an interface has no effect on how the interface on the router or switch operates.

When you configure the alias name of an interface, the CLI saves the alias name as the value of the ***interface-name*** variable in the configuration database. To enable backward compatibility with Junos OS releases in which the support for interface aliases is not available, when the Junos OS processes query the configuration database for the ***interface-name*** variable, the actual, exact value of the ***interface-name*** variable is returned instead of the alias name for system operations and computations.

This capability to define interface alias names for physical and logical interfaces is useful in a Junos Node Unifier (JNU) environment that contains a Juniper Networks MX Series 3D Universal Edge Router as a controller and EX Series Ethernet switches, QFX Series devices, and ACX Series Universal Access Routers as satellite devices. The following are the benefits of configuring an alias name, which enables a meaningful, single, and easily identifiable name to be allocated to an interface:

- You can group physical interfaces as one aggregated interface (link aggregation group or LAG bundle) and name that bundle as a satellite connection interface (for example, sat1).
- You can select a logical interface as a member of the LAG bundle or the entire LAG, and name that interface to represent a satellite device port or a service instance (for example, ge-0/0/1).
- You can combine the satellite name and the interface name aliases to wholly represent the satellite port name (for example, sat1:ge-0/0/1 or ge-sat1/0/0/1 or ge-1/0/0/1) in the most easily distinguishable format that denotes a combination of port and satellite parts of the name.

To specify an interface alias, you can use the **alias** statement at the **[edit interfaces interface-name unit logical-unit-number]** and **[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]** hierarchy levels.



NOTE: In Juniper Networks M Series Multiservice Edge Routers, if the same alias name is configured on more than one logical interface, the router displays an error message and commit fails.

Related Documentation

- [Example: Adding an Interface Alias Name on page 111](#)
- [alias on page 409](#)

Example: Adding an Interface Alias Name

This example shows how to add an alias to the logical unit of an interface. Using an alias to identify interfaces as they appear in the output for operational commands can allow for more meaningful naming conventions and easier identification.

- [Requirements on page 111](#)
- [Overview on page 111](#)
- [Configuration on page 111](#)
- [Verification on page 114](#)

Requirements

This example uses the following hardware and software components:

- One MX Series router that acts as a controller
- One EX4200 switch that acts as a satellite device
- Junos OS Release 13.3R1 or later

Overview

You can create an alias for each logical unit on a physical interface. The descriptive text you define for the alias is displayed in the output of the **show interfaces** commands. In Junos OS Release 12.3R8 and later, display of the alias can be suppressed in favor of the actual interface name by using the **display no-interface-alias** parameter along with the show command. The alias configured for a logical unit of an interface has no effect on how the interface on the router or switch operates – it is only a cosmetic label.

Configuration

Consider a scenario in which alias names are configured on the interfaces of a JNU controller that are connected to a satellite, sat1, in the downlink direction in the JNU management network by using two links. The alias names enable effective, streamlined

identification of these interfaces in the operational mode commands that are run on the controller and satellites.

- [Configuring Alias Names for the Controller Interfaces on page 112](#)
- [Results on page 113](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set interfaces ae0 unit 0 alias "controller-sat1-downlink1"
set interfaces ae0.0 family inet address 10.0.0.1/24
set interfaces ae1 unit 0 alias "controller-sat1-downlink1"
set interfaces ae0.0 family inet address 192.0.2.128/25
set interfaces ge-0/0/0 vlan-tagging
set interfaces ge-0/0/0 unit 0 alias "ge-to-corp-gw1"
set interfaces ge-0/0/0.0 vlan-id 101
set interfaces ge-0/0/0.0 family inet address 1.1.1.1/23
set interfaces ge-0/1/0 gigether-options 802.3ad ae0
set interfaces ge-0/1/1 gigether-options 802.3ad ae0
set protocols rip group corporate-firewall neighbor ge-to-corp-gw1
```

Configuring Alias Names for the Controller Interfaces

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To add an alias name to the controller interfaces that are used to connect to the satellite devices in the downlink direction:

1. Configure an alias name for the logical unit of an aggregated Ethernet interface that is used to connect to a satellite, sat1, in the downlink direction. Configure **inet** family and address for the interface.

```
[edit]
user@host# set interfaces ae0 unit 0 alias "controller-sat1-downlink1"
user@host# set interfaces ae0.0 family inet address 10.0.0.1/24
```

2. Configure an alias name for the logical unit of another aggregated Ethernet interface that is used to connect to the same satellite, sat1, in downlink direction. Configure **INET** family and address for the interface.

```
[edit]
user@host# set interfaces ae0 unit 1 alias "controller-sat1-downlink2"
user@host# set interfaces ae0.0 family inet address 10.0.0.3/24
```

3. Configure an alias name for the Gigabit Ethernet interface on the controller and configure its parameters.

```
[edit]
user@host# set interfaces ge-0/0/0 vlan-tagging
user@host# set interfaces ge-0/0/0 unit 0 alias "ge-to-corp-gw1"
user@host# set interfaces ge-0/0/0.0 vlan-id 101
user@host# set interfaces ge-0/0/0.0 family inet address 1.1.1.1/23
```

4. Configure Gigabit Ethernet interfaces to be member links of an **ae-** logical interface.

```
[edit]
user@host# set interfaces ge-0/1/0 gigether-options 802.3ad ae0
user@host# set interfaces ge-0/1/1 gigether-options 802.3ad ae0
```

5. Configure RIP in the network between the controller and the firewall gateway.

```
[edit]
user@host# set protocols rip group corporate-firewall neighbor ge-to-corp-gw1
```

Results

In configuration mode, confirm your configuration by entering the **show** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
interfaces {
  ae0 {
    unit 0 {
      alias "controller-sat1-downlink1";
      family inet {
        address 10.0.0.1/24;
      }
    }
    unit 1 {
      alias "controller-sat1-downlink2";
      family inet {
        address 10.0.0.3/24;
      }
    }
  }
  ge-0/0/0 {
    vlan-tagging;
    unit 0 {
      alias "ge-to-corp-gw1";
      vlan-id 101;
      family inet {
        address 1.1.1.1/23;
      }
    }
  }
  ge-0/1/0 {
    gigether-options {
      802.3ad ae0;
    }
  }
  ge-0/1/1 {
    gigether-options {
      802.3ad ae0;
    }
  }
  protocols rip {
    group corporate-firewall {
      neighbor ge-to-corp-gw1;
    }
  }
}
```

After you have confirmed that the interfaces are configured, enter the **commit** command in configuration mode.



NOTE: In Juniper Networks M Series Multiservice Edge Routers, if the same alias name is configured on more than one logical interface, the router displays an error message and commit fails.

Verification

To verify that the alias name is displayed instead of the interface name, perform these steps:

- [Verifying the Configuration of the Alias Name for the Controller Interfaces on page 114](#)

Verifying the Configuration of the Alias Name for the Controller Interfaces

Purpose Verify that the alias name is displayed instead of the interface name.

Action Display information about all RIP neighbors.

```
user@router> show rip neighbor
```

Neighbor	Local State	Source Address	Destination Address	Send Mode	Receive Mode	In Met
ge-to-corp-gw1	DN	(null)	255.255.255.255	mcast	both	1

Meaning The output displays the details of the benchmarking test that was performed. For more information about the **show rip neighbor** operational command, see **show rip neighbor** in the [CLI Explorer](#).

Related Documentation

- [Interface Alias Names Overview on page 110](#)
- [alias on page 409](#)

Clock Source Overview

For both the router and interfaces, the clock source can be an external clock that is received on the interface or the router's internal Stratum 3 clock.

For example, interface A can transmit on interface A's received clock (external, loop timing) or the Stratum 3 clock (internal, line timing, or normal timing). Interface A cannot use a clock from any other source. For interfaces such as SONET/SDH that can use different clock sources, you can configure the source of the transmit clock on each interface.

The clock source resides on the System Control Board (SCB) for M40 routers, the System and Switch Board (SSB) for M20 routers, the Control Board (CB) for M120 routers, and the Miscellaneous Control Subsystem (MCS) for M40e and M160 routers. M7i and M10i routers have a clock source on the Compact Forwarding Engine Board (CFEB) and Enhanced Compact Forwarding Engine Board (CFEB-E).

For T Series and MX Series, the clock source internal Stratum 3 clock resides on the SONET Clock Generator and Switch Control Board (SCB) respectively. By default, the 19.44-MHz Stratum 3 reference clock generates the clock signal for all serial PICs (SONET/SDH) and Plesiochronous Digital Hierarchy (PDH) PICs. PDH PICs include DS3, E3, T1, and E1 PICs.



NOTE: M7i and M10i routers do not support external clocking of SONET interfaces.

For information about clocking on channelized interfaces, see *Channelized IQ and IQE Interfaces Properties*. Also see *Configuring the Clock Source on SONET/SDH Interfaces* and *Configuring the Channelized T3 Loop Timing*.

For information about configuring an external synchronization interface that can be used to synchronize the internal Stratum 3 clock to an external source on the M40e, M120, M320, routers and T Series routers, see *Junos OS Administration Library for Routing Devices, Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers*.

For information about configuring Synchronous Ethernet on MX 80, MX240, MX480, and MX960 3D Universal Edge Routers, see *Junos OS Administration Library for Routing Devices, Synchronous Ethernet Overview* and *Configuring Clock Synchronization Interface on MX Series Routers*.

Related Documentation

- [Configuring an External Synchronization Interface](#)
- [Configuring the Clock Source on page 116](#)
- [Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers](#)
- [Synchronous Ethernet Overview](#)

- *Configuring Clock Synchronization Interface on MX Series Routers*

Configuring the Clock Source

For both the router and interfaces, the clock source can be an external clock that is received on the interface or the router's internal Stratum 3 clock.

To set the clock source as external or internal:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **clocking** option as external or internal.

```
[edit interfaces interface-name]
user@host# set clocking (external | internal)
```



NOTE: M7i and M10i routers do not support external clocking of SONET interfaces.



NOTE: On Channelized SONET/SDH PICs, if you set the parent (or the master) controller clock to external, then you must set the child controller clocks to the default value—that is, internal.

For example, on the Channelized STM1 PIC, if the clock on the Channelized STM1 interface (which is the master controller) is set to external, then you must not configure the CE1 interface (which is the child controller) clock to external. Instead you must configure the CE1 interface clock to internal.

For information about clocking on channelized interfaces, see *Channelized IQ and IQE Interfaces Properties*. Also see *Configuring the Clock Source on SONET/SDH Interfaces* and *Configuring the Channelized T3 Loop Timing*.

For information about configuring an external synchronization interface that can be used to synchronize the internal Stratum 3 clock to an external source on the M40e, M120, and M320 routers and on the T Series routers, see *Junos OS Administration Library for Routing Devices, Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers*.

For information about configuring Synchronous Ethernet on MX80, MX240, MX480, and MX960 3D Universal Edge Routers, see *Junos OS Administration Library for Routing Devices, Synchronous Ethernet Overview* and *Configuring Clock Synchronization Interface on MX Series Routers*.

Related Documentation

- *Configuring an External Synchronization Interface*
- [clocking on page 452](#)

- [Clock Source Overview on page 115](#)
- [Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers](#)
- [Synchronous Ethernet Overview](#)
- [Configuring Clock Synchronization Interface on MX Series Routers](#)

Configuring Interface Encapsulation on Physical Interfaces

- [Understanding Interface Encapsulation on Physical Interfaces on page 117](#)
- [Encapsulation Capabilities of Physical Interfaces on page 117](#)
- [Configuring the Encapsulation on a Physical Interface on page 118](#)
- [Displaying the Encapsulation on a Physical SONET/SDH Interface on page 119](#)

Understanding Interface Encapsulation on Physical Interfaces

Point-to-Point Protocol (PPP) encapsulation is the default encapsulation type for physical interfaces. You need not configure encapsulation for any physical interfaces that support PPP encapsulation. If you do not configure encapsulation, PPP is used by default.

For physical interfaces that do not support PPP encapsulation, you must configure an encapsulation to use for packets transmitted on the interface. You can optionally configure an encapsulation on a logical interface, which is the encapsulation used within certain packet types.

Encapsulation Capabilities of Physical Interfaces

When you configure a point-to-point encapsulation (such as PPP or Cisco HDLC) on a physical interface, the physical interface can have only one logical interface (that is, only one **unit** statement) associated with it. When you configure a multipoint encapsulation (such as Frame Relay), the physical interface can have multiple logical units, and the units can be either point-to-point or multipoint.

Ethernet CCC encapsulation for Ethernet interfaces with standard TPID tagging requires that the physical interface have only a single logical interface. Ethernet interfaces in VLAN mode can have multiple logical interfaces.

For Ethernet interfaces in VLAN mode, VLAN IDs are applicable as follows:

- VLAN ID 0 is reserved for tagging the priority of frames.
- For encapsulation type **vlan-ccc**, VLAN IDs 1 through 511 are reserved for normal VLANs. VLAN IDs 512 and above are reserved for VLAN CCCs.
- For encapsulation type **vlan-vpls**, VLAN IDs 1 through 511 are reserved for normal VLANs, and VLAN IDs 512 through 4094 are reserved for VPLS VLANs. For 4-port Fast Ethernet interfaces, you can use VLAN IDs 512 through 1024 for VPLS VLANs.
- For Gigabit Ethernet interfaces and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router),

you can configure flexible Ethernet services encapsulation on the physical interface. For interfaces with **flexible-ethernet-services** encapsulation, all VLAN IDs are valid. VLAN IDs from 1 through 511 are not reserved.

- For encapsulation types **extended-vlan-ccc** and **extended-vlan-vpls**, all VLAN IDs are valid.

The upper limits for configurable VLAN IDs vary by interface type.

When you configure a TCC encapsulation, some modifications are needed to handle VPN connections over unlike Layer 2 and Layer 2.5 links and terminate the Layer 2 and Layer 2.5 protocol locally.

The router performs the following media-specific changes:

- PPP TCC—Both Link Control Protocol (LCP) and Network Control Protocol (NCP) are terminated on the router. Internet Protocol Control Protocol (IPCP) IP address negotiation is not supported. The Junos OS strips all PPP encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to PPP encapsulation.
- Cisco HDLC TCC—Keepalive processing is terminated on the router. The Junos OS strips all Cisco HDLC encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to Cisco HDLC encapsulation.
- Frame Relay TCC—All Local Management Interface (LMI) processing is terminated on the router. The Junos OS strips all Frame Relay encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to Frame Relay encapsulation.
- ATM—Operation, Administration, and Maintenance (OAM) and Interim Local Management Interface (ILMI) processing is terminated at the router. Cell relay is not supported. The Junos OS strips all ATM encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to ATM encapsulation.

Configuring the Encapsulation on a Physical Interface

By default, PPP is the encapsulation type for physical interfaces. To configure the encapsulation on a physical interface, include the encapsulation statement at the **[edit interfaces *interface-name*]** hierarchy level:

To configure encapsulation on a physical interface:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit]
user@host# set interfaces so-fpc/pic/port
```

2. Configure the encapsulation type as described in [encapsulation](#).

```
[edit interfaces mo-fpc/pic/port]
user@host# set encapsulation encapsulation-type
```


**NOTE:**

- When you configure a point-to-point encapsulation (such as PPP or Cisco HDLC) on a physical interface, the physical interface can have only one logical interface (that is, only one unit statement) associated with it. When you configure a multipoint encapsulation (such as Frame Relay), the physical interface can have multiple logical units, and the units can be either point-to-point or multipoint.
- When the encapsulation type is set to Cisco-compatible Frame Relay encapsulation, ensure that the LMI type is set to ANSI or Q933-A.
- When vlan-vpls encapsulation is set at the physical interface level, commit check will validate that there should not be any inet family configured within it.

Displaying the Encapsulation on a Physical SONET/SDH Interface

Purpose To display the configured encapsulation and its associated set options on a physical interface when the following are set at the **[edit interfaces *interface-name*]** hierarchy level:

- interface-name—so-7/0/0
- Encapsulation—**ppp**
- Unit—0
- Family—**inet**
- Address—192.168.1.113/32
- Destination—192.168.1.114
- Family—**iso** and **mpls**

Action Run the **show** command at the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit interfaces so-7/0/0]
user@host# show
encapsulation ppp;
unit 0 {
  point-to-point;
  family inet {
    address 192.168.1.113/32 {
      destination 192.168.1.114;
    }
  }
  family iso;
  family mpls;
}
```

Meaning The configured encapsulation and its associated set options are displayed as expected. Note that the second set of two **family** statements allow IS-IS and MPLS to run on the interface.

- Related Documentation
- [encapsulation on page 526](#)
 - [Configuring the Media MTU on page 104](#)

Configuring Interface Encapsulation on PTX Series Packet Transport Routers

This topic describes how to configure interface encapsulation on PTX Series Packet Transport Routers. Use the **flexible-ethernet-services** configuration statement to configure different encapsulation for different logical interfaces under a physical interface. With flexible Ethernet services encapsulation, you can configure each logical interface encapsulation without range restrictions for VLAN IDs.

Supported encapsulations for physical interfaces include:

- **flexible-ethernet-services**
- **ethernet-ccc**
- **ethernet-tcc**

Supported encapsulations for logical interfaces include:

- **ethernet**
- **vlan-ccc**
- **vlan-tcc**



NOTE: PTX Series Packet Transport Routers do not support **extended-vlan-cc** and **extended-vlan-tcc** encapsulation on logical interfaces. Instead, you can configure a tag protocol ID (TPID) value of 0x9100 to achieve the same results.

To configure flexible Ethernet services encapsulation, include the **encapsulation flexible-ethernet-services** statement at the **[edit interfaces et-fpc/pic/port]** hierarchy level. For example:

```
interfaces {
  et-fpc/pic/port {
    vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 0 {
      vlan-id 1000;
      family inet {
        address 11.0.0.20/24;
      }
    }
    unit 1 {
      encapsulation vlan-ccc;
      vlan-id 1010;
    }
    unit 2 {
```

```

encapsulation vlan-tcc;
vlan-id 1020;
family tcc {
    proxy {
        inet-address 11.0.2.160;
    }
    remote {
        inet-address 11.0.2.10;
    }
}
}
}
}

```

Related Documentation • [Configuring Interface Encapsulation on Physical Interfaces on page 117](#)

Configuring Keepalives

By default, physical interfaces configured with Cisco HDLC or PPP encapsulation send keepalive packets at 10-second intervals. The Frame Relay term for keepalives is LMI packets; the Junos OS supports both ANSI T1.617 Annex D LMIs and ITU Q933 Annex A LMIs. On ATM networks, OAM cells perform the same function. You configure OAM cells at the logical interface level; for more information, see [Defining the ATM OAM F5 Loopback Cell Period](#).

To disable the sending of keepalives:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```

[edit ]
user@host# edit interfaces interface-name

```

2. Include the **no-keepalives** statement at the **[edit interfaces *interface-name*]** hierarchy level.

```

[edit interfaces interface-name]
no-keepalives;

```

To disable the sending of keepalives on a physical interface configured with Cisco HDLC encapsulation for a translational cross-connection:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```

[edit ]
user@host# edit interfaces interface-name

```

2. Include the **no-keepalives** statement with the **encapsulation cisco-hdlc-tcc** statement at the **[edit interfaces *interface-name*]** hierarchy level.

```

[edit interfaces interface-name]
encapsulation cisco-hdlc-tcc;
no-keepalives;

```

To disable the sending of keepalives on a physical interface configured with PPP encapsulation for a translational cross-connection:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **no-keepalives** statement with the **encapsulation ppp-tcc** statement at the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit interfaces interface-name]
encapsulation ppp-tcc;
no-keepalives;
```

For more information about translation cross-connections, see Circuit and Translational Cross-Connects Overview.

When you configure PPP over ATM or Multilink PPP over ATM encapsulation, you can enable or disable keepalives on the logical interface. For more information, see Configuring PPP over ATM2 Encapsulation.

To explicitly enable the sending of keepalives:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **keepalives** statement at the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit interfaces interface-name]
keepalives;
```

To change one or more of the default keepalive values:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **keepalives** statement with the appropriate option as **interval *seconds***, **down-count *number***, and the **up-count *number***.

```
[edit interfaces interface-name]
keepalives;
keepalives <interval seconds> <down-count number> <up-count number>;
```

On interfaces configured with Cisco HDLC or PPP encapsulation, you can include the following three keepalive statements; note that Frame Relay encapsulation is not affected by these statements:

- **interval *seconds***—The time in seconds between successive keepalive requests. The range is from 1 second through 32767 seconds, with a default of 10 seconds.

- **down-count *number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is from 1 through 255, with a default of 3.
- **up-count *number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is from 1 through 255, with a default of 1.



CAUTION: If interface keepalives are configured on an interface that does not support the keepalives configuration statement (for example, 10-Gigabit Ethernet), the link layer may go down when the PIC is restarted. Avoid configuring the keepalives on interfaces that do not support the keepalives configuration statement.

For information about Frame Relay keepalive settings, see *Configuring Frame Relay Keepalives*.

On MX Series routers with Modular Port Concentrators/Modular Interface Cards (MPCs/MICs), the Packet Forwarding Engine on an MPC/MIC processes and responds to Link Control Protocol (LCP) Echo-Request keepalive packets that the PPP subscriber (client) initiates and sends to the router. The mechanism by which LCP Echo-Request packets are processed by the Packet Forwarding Engine instead of by the Routing Engine is referred to as *PPP fast keepalive*. For more information about how PPP fast keepalive works on an MX Series router with MPCs/MICs, see the *Junos OS Subscriber Access Configuration Guide*.

Related Documentation

- *Defining the ATM OAM F5 Loopback Cell Period*
- *Disabling the Sending of PPPoE Keepalive Messages*
- *Understanding How the Router Processes Subscriber-Initiated PPP Fast Keepalive Requests*
- [keepalives on page 625](#)
- [no-keepalives on page 715](#)
- *Configuring Frame Relay Keepalives*
- [Circuit and Translational Cross-Connects Overview on page 247](#)
- *Configuring PPP over ATM2 Encapsulation Overview*

Configuring the PPP Challenge Handshake Authentication Protocol

- [PPP Challenge Handshake Authentication Protocol on page 124](#)
- [Configuring the PPP Challenge Handshake Authentication Protocol on page 124](#)
- [Displaying the Configured PPP Challenge Handshake Authentication Protocol on page 125](#)

PPP Challenge Handshake Authentication Protocol

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, PPP Challenge Handshake Authentication Protocol (CHAP). When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer. By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes no CHAP challenges and denies all incoming CHAP challenges. To enable CHAP, you must create an access profile, and you must configure the interfaces to use CHAP.

Configuring the PPP Challenge Handshake Authentication Protocol

When you configure an interface to use CHAP, you must assign an access profile to the interface. When an interface receives CHAP challenges and responses, the access profile in the packet is used to look up the shared secret, as defined in RFC 1994. If no matching access profile is found for the CHAP challenge that was received by the interface, the optionally configured default CHAP secret is used. The default CHAP secret is useful if the CHAP name of the peer is unknown, or if the CHAP name changes during PPP link negotiation.

To enable CHAP, you must create an access profile, and you must configure the interfaces to use PAP. For more information on how to configure access profile, see *Configuring Access Profiles for L2TP or PPP Parameters*.

To configure the PPP challenge handshake authentication protocol, on each physical interface with PPP encapsulation, perform the following steps.

1. To assign an access profile to an interface, include the **access-profile** statement at the **[edit interfaces interface-name ppp-options chap]** hierarchy level.

```
[edit interfaces interface-name ppp-options chap]
user@host# set access-profile name
```



NOTE: You must include the **access-profile** statement when you configure the CHAP authentication method. If an interface receives a CHAP challenge or response from a peer that is not in the applied access profile, the link is immediately dropped unless a default CHAP secret has been configured.

2. The default CHAP secret is used when no matching CHAP access profile exists, or if the CHAP name changes during PPP link negotiation. To configure a default CHAP secret for an interface, include the **default-chap-secret** statement at the **[edit interfaces interface-name ppp-options chap]** hierarchy level.

```
[edit interfaces interface-name ppp-options chap]
user@host# set default-chap-secret name
```

3. To configure the name the interface uses in CHAP challenge and response packets, include the **local-name** statement at the **[edit interfaces interface-name ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
user@host# set local-name name
```

**NOTE:**

- The local name is any string from 1 through 32 characters in length, starting with an alphanumeric or underscore character, and including only the following characters:

a-z A-Z 0-9 % @ # / \ . _ -

- By default, when CHAP is enabled on an interface, the interface uses the router's system hostname as the name sent in CHAP challenge and response packets.

4. You can configure the interface not to challenge its peer, and only respond when challenged. To configure the interface not to challenge its peer, include the **passive** statement at the **[edit interfaces interface-name ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
user@host# set passive;
```



NOTE: By default, when CHAP is enabled on an interface, the interface always challenges its peer and responds to challenges from its peer.

Displaying the Configured PPP Challenge Handshake Authentication Protocol

Purpose To display the configured PPP CHAP at the **[edit access]** and **[edit interfaces]** hierarchy levels.

- Access profile—**pe-A-ppp-clients**
- default CHAP secret data—"**\$ABC123**"
- hostname for the CHAP challenge and response packets—"**pe-A-so-1/1/1**"
- Interface—**so-1/1/2**

Action • Run the **show** command at the **[edit access]** hierarchy level.

```
profile pe-A-ppp-clients;
client cpe-1 chap-secret "$ABC123";
# SECRET-DATA
[edit interfaces so-1/2/0]
encapsulation ppp;
ppp-options {
  chap {
    access-profile pe-A-ppp-clients;
    default-chap-secret "$ABC123";
    local-name "pe-A-so-1/1/1";
  }
}
```

- Run the **show** command at the **[edit interfaces s0-1/1/2]** hierarchy level.

```
ppp-options {
  chap {
```

```
access-profile pe-A-ppp-clients;  
default-chap-secret "$ABC123";  
local-name "pe-A-so-1/1/2";  
}  
}
```

Meaning The configured CHAP and its associated set options are displayed as expected.

Configuring the PPP Password Authentication Protocol On a Physical Interface

- [Understanding PPP Password Authentication Protocol on page 126](#)
- [Configuring the PPP Password Authentication Protocol On a Physical Interface on page 126](#)
- [Configuring the PPP Password Authentication Protocol On a Logical Interface on page 127](#)

Understanding PPP Password Authentication Protocol

For interfaces with PPP encapsulation, you can configure interfaces to support the Password Authentication Protocol (PAP), as defined in RFC 1334, *PAP Authentication Protocols*. If authentication is configured, the PPP link negotiates using CHAP or PAP protocol for authentication during the Link Control Protocol (LCP) negotiation phase. PAP is only performed after the link establishment phase (LCP up) portion of the authentication phase.

During authentication, the PPP link sends a PAP authentication-request packet to the peer with an ID and password. The authentication-request packet is sent every 2 seconds, similar to the CHAP challenge, until a response is received (acknowledgment packet, nonacknowledgment packet). If an acknowledgment packet is received, the PPP link transitions to the next state, the network phase. If a nonacknowledgment packet is received, an LCP terminate request is sent, and the PPP link goes back to the link establishment phase. If no response is received, and an optional retry counter is set to **true**, a new request acknowledgment packet is resent. If the retry counter expires, the PPP link transitions to the LCP negotiate phase.

You can configure the PPP link with PAP in passive mode. By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring the PPP Password Authentication Protocol On a Physical Interface

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in the packet is used to look up the password.

To enable PAP, you must create an access profile, and you must configure the interfaces to use PAP. For more information on how to configure access profile, see *Configuring Access Profiles for L2TP or PPP Parameters*.

To configure the PPP password authentication protocol, on each physical interface with PPP encapsulation, perform the following steps.

1. To assign an access profile to an interface, include the **access-profile** statement at the **[edit interfaces interface-name ppp-options pap]** hierarchy level.

```
[edit interfaces interface-name ppp-options pap]
user@host# set access-profile name
```

2. To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces interface-name ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
user@host# set local-name name
```

3. You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces interface-name ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
user@host# set local-password password
```



NOTE: By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

4. To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces interface-name ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
user@host# set passive
```



NOTE: By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring the PPP Password Authentication Protocol On a Logical Interface

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in

the packet is used to look up the password. If no matching access profile is found for the PAP authentication request that was received by the interface, the optionally configured default PAP password is used.

To configure the PPP password authentication protocol, on each logical interface with PPP encapsulation, perform the following steps.

1. To configure the default PAP password, include the **pap-password** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set default-pap-password password
```

2. To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
user@host# set local-name name
```

3. You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set local-password password
```



NOTE: By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

4. To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set passive
```



NOTE: By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring PPP Address and Control Field Compression

For interfaces with PPP, PPP CCC, or PPP TCC encapsulation, you can configure compression of the Data Link Layer address and control fields, as defined in RFC 1661, *The Point-to-Point Protocol (PPP)*. By default, the address and control fields are not compressed. This means PPP-encapsulated packets are transmitted with two 1-byte fields (0xff and 0x03). If you configure address and control field compression (ACFC) and ACFC is successfully negotiated with the local router's peer, the local router transmits packets without these 2 bytes. ACFC allows you to conserve bandwidth by transmitting less data.

On M320, M120, and T Series routers, ACFC is not supported for any ISO family protocols. Do not include the **acfc** statement at the **[edit interfaces *interface-name* ppp-options compression]** hierarchy level when you include the **family iso** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.



NOTE: The address and control fields cannot be compressed in Link Control Protocol (LCP) packets.

The PPP session restarts when you configure or modify compression options.

To configure ACFC:

1. In configuration mode, go to the **[edit interfaces *interface-name* ppp-options]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name ppp-options
```

2. Include the **compression** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level, and specify **acfc**.

```
[edit interfaces interface-name ppp-options]
compression acfc;
```

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **link flags** field for the physical interface. Successfully negotiated options are displayed in the **flags** field for the logical interface. In this example, both ACFC and PFC are configured, but neither compression feature has been successfully negotiated.

```
user@router# run show interfaces so-0/1/1
Physical interface: so-0/1/1, Enabled, Physical link is Up
Interface index: 133, SNMP ifIndex: 27
Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: 0C3,
Loopback: None, FCS: 16
Payload scrambler: Enabled
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps 16384
Link flags    : No-Keepalives ACFC PFC
LCP state: Opened
```

```
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Not-configured
CoS queues      : 4 supported
Last flapped    : 2004-12-29 10:49:32 PST (00:18:35 ago)
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
SONET alarms    : None
SONET defects   : None
Logical interface so-0/1/1.0 (Index 68) (SNMP ifIndex 169)
  Flags: Point-To-Point SNMP-Traps ACFC Encapsulation: PPP
  Protocol inet, MTU: 4470
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 3.3.3/24, Local: 3.3.3.2, Broadcast: 3.3.3.255
```

This configuration causes the local router to try to negotiate ACFC with its peer. If ACFC is successfully negotiated, the local router sends packets with compressed address and control fields. When you include the **compression acfc** statement in the configuration, the PPP session restarts, and the local router sends the ACFC option in the LCP Configure-Request packet. The ACFC option informs the local router's peer that the local router can receive packets with compression. If the peer indicates that it, too, can receive packets with compression, then ACFC is negotiated. If ACFC is successfully negotiated, the local router can receive packets with or without the address and control bytes included.

Related Documentation

- [ppp-options on page 781](#)
- [compression on page 458](#)
- [acfc on page 390](#)

Configuring the PPP Protocol Field Compression

For interfaces with PPP, PPP CCC, or PPP TCC encapsulation, you can configure protocol field compression. By default, the protocol field is not compressed. This means PPP-encapsulated packets are transmitted with a two-byte protocol field. For example, IPv4 packets are transmitted with the protocol field set to 0x0021, and MPLS packets are transmitted with the protocol field set to 0x0281.

For all protocols with identifiers in the range 0x0000 through 0x00ff, you can configure the router to compress the protocol field to one byte, as defined in RFC 1661, *The Point-to-Point Protocol (PPP)*. Protocol field compression (PFC) allows you to conserve bandwidth by transmitting less data.



NOTE: The protocol field cannot be compressed in Link Control Protocol (LCP) packets.

The PPP session restarts when you configure or modify compression options.

To configure PFC:

1. In configuration mode, go to the `[edit interfaces interface-name ppp-options]` hierarchy level.

`[edit]`

`user@host# edit interfaces interface-name ppp-options`

2. Include the **compression** statement at the `[edit interfaces interface-name ppp-options]` hierarchy level, and specify **pfc**.

`[edit interfaces interface-name ppp-options]`

compression pfc;

To monitor the configuration, issue the **show interfaces *interface-name*** command.

Configured options are displayed in the **link flags** field for the physical interface.

Successfully negotiated options are displayed in the **flags** field for the logical interface.

In this example, both ACFC and PFC are configured, but neither compression feature has been successfully negotiated.

```
user@router# run show interfaces so-0/1/1
```

```
Physical interface: so-0/1/1, Enabled, Physical link is Up
```

```
Interface index: 133, SNMP ifIndex: 27
```

```
Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3,
Loopback: None, FCS: 16,
```

```
Payload scrambler: Enabled
```

```
Device flags : Present Running
```

```
Interface flags: Point-To-Point SNMP-Traps 16384
```

```
Link flags : No-Keepalives ACFC PFC
```

```
LCP state: Opened
```

```
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
```

```
CHAP state: Not-configured
```

```
CoS queues : 4 supported
```

```
Last flapped : 2004-12-29 10:49:32 PST (00:18:35 ago)
```

```
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
SONET alarms    : None
SONET defects   : None
Logical interface so-0/1/1.0 (Index 68) (SNMP ifIndex 169)
  Flags: Point-To-Point SNMP-Traps ACFC Encapsulation: PPP
  Protocol inet, MTU: 4470
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 3.3.3/24, Local: 3.3.3.2, Broadcast: 3.3.3.255
```

This configuration causes the local router to try to negotiate PFC with its peer. If PFC is successfully negotiated, the local router sends packets with compressed protocol fields. When you include the **compression pfc** statement in the configuration, the PPP session restarts, and the local router sends the PFC option in the LCP Configure-Request packet. The PFC option informs the local router's peer that the local router can receive packets with compression. If the peer indicates that it, too, can receive packets with compression, then PFC is negotiated. If PFC is successfully negotiated, the local router can receive packets with either 2-byte (uncompressed) or 1-byte (compressed) protocol fields.

Related Documentation

- [ppp-options on page 781](#)
- [compression on page 458](#)
- [pfc on page 762](#)

Monitoring a PPP Session

You can monitor PPP packet exchanges. When monitoring is enabled, packets exchanged during a session are logged by default to `/var/log/pppd`, or to the file specified in the **traceoptions** statement.

To monitor a PPP session:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit ]
user@host# edit protocols ppp
```

2. Include the **monitor-session** statement.

```
[edit protocols ppp]
user@host# monitor-session (interface-name | all);
```

When monitoring is configured, the operational mode commands **show ppp summary** and **show ppp interface** display a **Monitored** flag in the **Session flags** column or line.

Related Documentation

- [monitor-session on page 684](#)

Tracing Operations of the pppd Process

You can trace the operations of the router's pppd process.

To trace the router's pppd process:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit ]
user@host# edit protocols ppp
```

2. Include the **traceoptions** statement.

```
[edit protocols ppp]
traceoptions {
  file filename <files number> <match regular-expression> <size size> <world-readable |
    no-world-readable>;
  flag flag;
  level severity-level;
  no-remote-trace;
}
```

- To specify more than one tracing operation, include multiple **flag** statements.

You can specify the following flags in the **traceoptions** statement:

- **access**—Trace access code
- **address-pool**—Trace address pool code
- **all**—Trace all areas of code
- **auth**—Trace authentication code
- **chap**—Trace challenge handshake authentication protocol code
- **ci**—Trace CI code
- **config**—Trace configuration code
- **ifdb**—Trace interface database code
- **lcp**—Trace LCP state machine code
- **memory**—Trace memory management code
- **message**—Trace message processing code
- **mlppp**—Trace multilink point-to-point protocol code
- **ncp**—Trace NCP state machine code
- **pap**—Trace password authentication protocol code
- **ppp**—Trace PPP protocol processing code
- **radius**—Trace RADIUS processing code
- **redundancy**—Trace redundancy code
- **rtsock**—Trace routing socket code

- **session**—Trace session management code
- **signal**—Trace signal handling code
- **timer**—Trace timer code
- **ui**—Trace user interface code

Related Documentation [traceoptions on page 890](#)

Configuring the Router as a DCE with Frame Relay Encapsulation

By default, when you configure an interface with Frame Relay encapsulation, the routing platform is assumed to be data terminal equipment (DTE). That is, the routing platform is assumed to be at a terminal point on the network.

When you configure the router to be a data circuit-terminating equipment (DCE), keepalives are disabled by default.

To configure the router to be DCE:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **dce** option to respond to Frame Relay status enquiry messages.

```
[edit interfaces interface-name]
user@host# set dce
```

Perform one of the following tasks for back-to-back Frame Relay connections:

- Disable sending of keepalives on both sides of the connection.
- Configure one side of the connection as a DTE (the default Junos configuration) by removing the **dce** statement from the configuration and the other as a DCE.

Related Documentation • [dce on page 478](#)

Receive and Transmit Leaky Bucket Properties Overview

Congestion control is particularly difficult in high-speed networks with high volumes of traffic. When congestion occurs in such a network, it is usually too late to react. You can avoid congestion by regulating the flow of packets into your network. Smoother flows prevent bursts of packets from arriving at (or being transmitted from) the same interface and causing congestion.

For all interface types except ATM, Fast Ethernet, Gigabit Ethernet, and channelized IQ and IQE, you can configure leaky bucket properties, which allow you to limit the amount of traffic received on and transmitted by a particular interface. You effectively specify what percentage of the interface's total capacity can be used to receive or transmit

packets. You might want to set leaky bucket properties to limit the traffic flow from a link that is known to transmit high volumes of traffic.



NOTE: Instead of configuring leaky bucket properties, you can limit traffic flow by configuring policers. Policers work on all interfaces. For more information, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

The leaky bucket is used at the host-network interface to allow packets into the network at a constant rate. Packets might be generated in a bursty manner, but after they pass through the leaky bucket, they enter the network evenly spaced. In some cases, you might want to allow short bursts of packets to enter the network without smoothing them out. By controlling the number of packets that can accumulate in the bucket, the **threshold** property controls burstiness. The maximum number of packets entering the network in time units is **threshold + rate * t**.

By default, leaky buckets are disabled and the interface can receive and transmit packets at the maximum line rate.

For each DS3 channel on a channelized OC12 interface, you can configure unique receive and transmit buckets.



NOTE: HDLC payload scrambling conflicts with traffic shaping configured using leaky bucket properties. If you configure leaky bucket properties, you must disable payload scrambling, because the Junos OS rejects configurations that have both features enabled. For more information, see *Configuring SONET/SDH HDLC Payload Scrambling for Link Stability*.

Related Documentation

- [Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135](#)
- [SONET/SDH Interfaces Overview](#)
- [receive-bucket on page 807](#)
- [transmit-bucket on page 897](#)

Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion

You can configure leaky bucket properties which allow you to limit the amount of traffic received on and transmitted by a particular interface. You can specify what percentage of the interface's total capacity can be used to receive or transmit packets. You might want to set leaky bucket properties to limit the traffic flow from a link that is known to transmit high volumes of traffic.

To configure leaky bucket properties:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **receive-bucket** statement.

```
[edit interfaces interface-name]
user@host# set receive-bucket
```

3. Configure the **overflow** option, the **threshold** option, and the **rate** option for the receive leaky bucket, which specifies what percentage of the interface's total capacity can be used to receive packets.

```
[edit interfaces interface-name receive-bucket]
user@host# set overflow (discard | tag)
user@host# set threshold bytes
user@host# set rate percentage
```

4. Configure the **transmit-bucket** statement.

```
[edit interfaces interface-name]
user@host# set transmit-bucket
```

5. Configure the **overflow** option, the **threshold** option, and the **rate** option for the transmit leaky bucket, which specifies what percentage of the interface's total capacity can be used to transmit packets.

```
[edit interfaces interface-name transmit-bucket]
user@host# set overflow (discard | tag)
user@host# set threshold bytes
user@host# set rate percentage
```

**Related
Documentation**

- [Receive and Transmit Leaky Bucket Properties Overview on page 134](#)
- [SONET/SDH Interfaces Overview](#)
- [receive-bucket on page 807](#)
- [transmit-bucket on page 897](#)

Understanding Unidirectional Traffic Flow on Physical Interfaces

By default, physical interfaces are bidirectional; that is, they both transmit and receive traffic. You can configure unidirectional link mode on a 10-Gigabit Ethernet interface that creates two new physical interfaces that are unidirectional. The new transmit-only and receive-only interfaces operate independently, but both are subordinate to the original parent interface.

The unidirectional interfaces enable the configuration of a unidirectional link topology. Unidirectional links are useful for applications such as broadband video services where almost all traffic flow is in one direction, from the provider to the user. Unidirectional link mode conserves bandwidth by enabling it to be differentially dedicated to transmit and receive interfaces. In addition, unidirectional link mode conserves ports for such applications because the transmit-only and receive-only interfaces act independently. Each can be connected to different routers, for example, reducing the total number of ports required.



NOTE: Unidirectional link mode is currently supported on only the following hardware:

- 4-port 10-Gigabit Ethernet DPC on the MX960 router
- 10-Gigabit Ethernet IQ2 PIC and 10-Gigabit Ethernet IQ2E PIC on the T Series router

The transmit-only interface is always operationally up. The operational status of the receive-only interface depends only on local faults; it is independent of remote faults and of the status of the transmit-only interface.

On the parent interface, you can configure attributes common to both interfaces, such as clocking, framing, gige-ether-options, and sonet-options. On each of the unidirectional interfaces, you can configure encapsulation, MAC address, MTU size, and logical interfaces.

Unidirectional interfaces support IP and IPv6. Packet forwarding takes place by means of static routes and static ARP entries, which you can configure independently on both unidirectional interfaces.

Only transmit statistics are reported on the transmit-only interface (and shown as zero on the receive-only interface). Only receive statistics are reported on the receive-only interface (and shown as zero on the transmit-only interface). Both transmit and receive statistics are reported on the parent interface.

Related Documentation

- [unidirectional on page 907](#)
- [Enabling Unidirectional Traffic Flow on Physical Interfaces on page 138](#)

Enabling Unidirectional Traffic Flow on Physical Interfaces

By default, physical interfaces are bidirectional; that is, they both transmit and receive traffic. You can configure unidirectional link mode on a 10-Gigabit Ethernet interface that creates two new physical interfaces that are unidirectional. The new transmit-only and receive-only interfaces operate independently, but both are subordinate to the original parent interface.

To enable unidirectional link mode on a physical interface, perform the following steps:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **unidirectional** option to create two new, unidirectional (transmit-only and receive-only) physical interfaces subordinate to the original parent interface.

```
[edit interfaces interface-name]
user@host# set unidirectional
```



NOTE: Unidirectional link mode is currently supported on only the following hardware:

- 4-port 10-Gigabit Ethernet DPC on the MX960 router
 - 10-Gigabit Ethernet IQ2 PIC and 10-Gigabit Ethernet IQ2E PIC on the T Series router
-

Related Documentation

- [unidirectional on page 907](#)
- [Understanding Unidirectional Traffic Flow on Physical Interfaces on page 137](#)

Physical Interface Damping Overview

Physical interface damping limits the advertisement of the up and down transitions (flapping) on an interface. Each time a transition occurs, the interface state is changed, which generates an advertisement to the upper-level routing protocols. Damping helps reduce the number of these advertisements.

From the viewpoint of network deployment, physical interface flaps fall into the following categories:

- Nearly instantaneous multiple flaps of short duration (milliseconds).
- Periodic flaps of long duration (seconds).

Figure 6 on page 139 is used to describe these types of interface flaps and the damping configuration that you can use in each case.

Figure 6: Two Router Interfaces Connected Through Transport Equipment



NOTE: We recommend that you use similar damping configurations on both ends of the physical interface. Configuring damping on one end and not having interface damping on the other end can result in undesired behavior.

The following sections describe the types of interface damping depending upon the transition time length.

- [Damping Overview for Shorter Physical Interface Transitions on page 139](#)
- [Damping Overview for Longer Physical Interface Transitions on page 140](#)

Damping Overview for Shorter Physical Interface Transitions

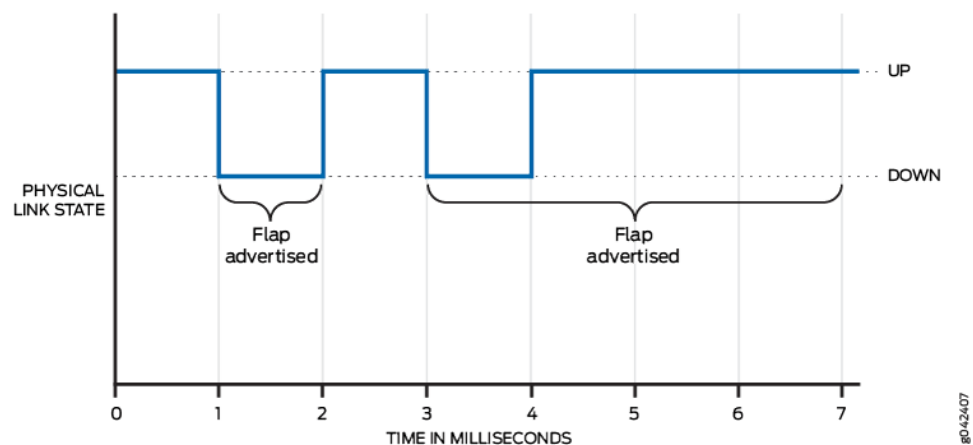
Figure 6 on page 139 shows two routers with two transport devices between them. If a redundant link between the two transport devices fails, link switching is performed. Link switching takes a number of milliseconds. As shown in Figure 7 on page 140, during switching, both router interfaces might encounter multiple flaps with an up-and-down duration of several milliseconds. These multiple flaps, if advertised to the upper-level routing protocols, might result in undesired route updates. This is why you might want to damp these interface flaps.



NOTE: Damping is suitable only with routing protocols.

For shorter physical interface transitions, you configure interface damping with the **hold-time** statement on the interface. The hold timer enables interface damping by not advertising interface transitions until the hold timer duration has passed. When a hold-down timer is configured and the interface goes from up to down, the down hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still *down*, then the router begins to advertise the interface as being down. Similarly, when a hold-up timer is configured and an interface goes from down to up, the up hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still *up*, then the router begins to advertise the interface as being up.

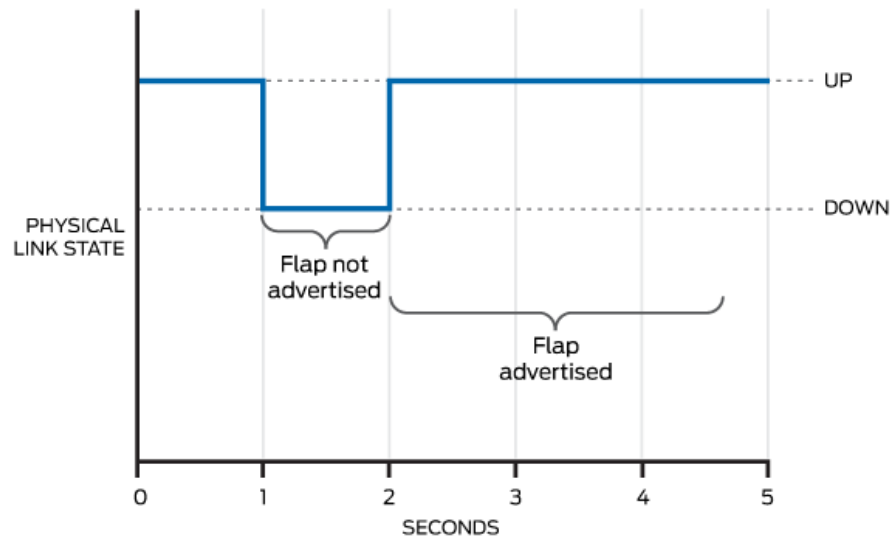
Figure 7: Multiple Flaps of Short Duration (Milliseconds)



Damping Overview for Longer Physical Interface Transitions

When the link between a router interface and the transport devices is not stable, this can lead to periodic flapping, as shown in [Figure 8 on page 141](#). Flaps occur in the order of seconds or more, with an up-and-down flap duration in the order of a second or more. In this case, using the hold timer feature might not produce optimal results as it cannot suppress the relatively longer and repeated interface flaps. Increasing the hold time duration to seconds still allows the system to send route updates on the flapping interface, so fails to suppress periodically flapping interfaces on the system.

Figure 8: Periodic Flaps of Long Duration (Seconds)



g042408

For longer periodic interface flaps, you configure interface damping with the **damping** statement on the interface. This damping method uses an exponential back-off algorithm to suppress interface up-and-down event reporting to the upper-level protocols. Every time an interface goes down, a penalty is added to the interface penalty counter. If at some point the accumulated penalty exceeds the suppress level, the interface is placed in the suppress state, and further interface link up and down events are not reported to the upper-level protocols.

**NOTE:**

- Only PTX Series routers, T Series routers, MX960 routers, MX480 routers, MX240 routers, MX80 routers, and M10i routers support interface damping for longer periodic interface flaps.
- Penalty added on every interface flap is 1000.
- The system does not indicate whether an interface is down because of suppression or that is the actual state of the physical interface. Because of this, SNMP link traps and Operation, Administration, and Maintenance (OAM) protocols cannot differentiate the damped version of the link state from the real version. Therefore, the traps and protocols might not work as expected.
- You can verify suppression by viewing the information in the Damping field of the `show interface extensive` command output.

At all times, the interface penalty counter follows an exponential decay process.

[Figure 9 on page 143](#) and [Figure 10 on page 144](#) show the decay process as it applies to recovery when the physical level link is down or up. As soon as the accumulated penalty reaches the lower boundary of the reuse level, the interface is marked as unsuppressed,

and further changes in the interface link state are again reported to the upper-level protocols. You use the **max-suppress** option to configure the maximum time for restricting the accumulation of the penalty beyond the value of the maximum penalty. The value of the maximum penalty is calculated by the software. The maximum penalty corresponds to the time it would take max-suppress to decay and reach the reuse level. The penalty continues to decay after crossing the reuse level.

[Figure 9 on page 143](#) and [Figure 10 on page 144](#) show the accumulated penalty, and the decay over time as a curve. Whenever the penalty is below the reuse level and the physical level link changes state, state changes are advertised to the system and cause SNMP state changes.

[Figure 9 on page 143](#) shows the penalty dropping below the reuse level when the physical link is down. The system is notified of a state change only after the physical level link transitions to up.

Figure 9: Physical-Level Link Is Down When the Penalty Falls Below the Reuse Level

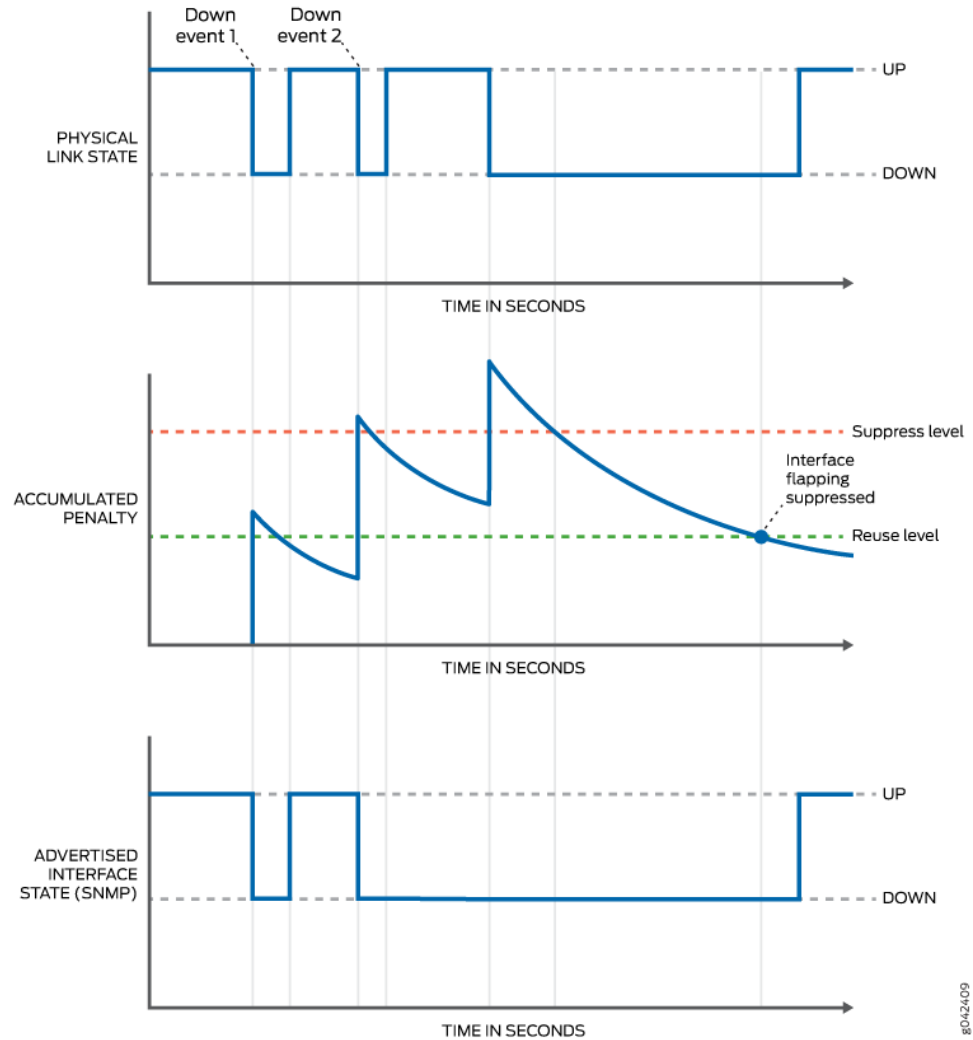
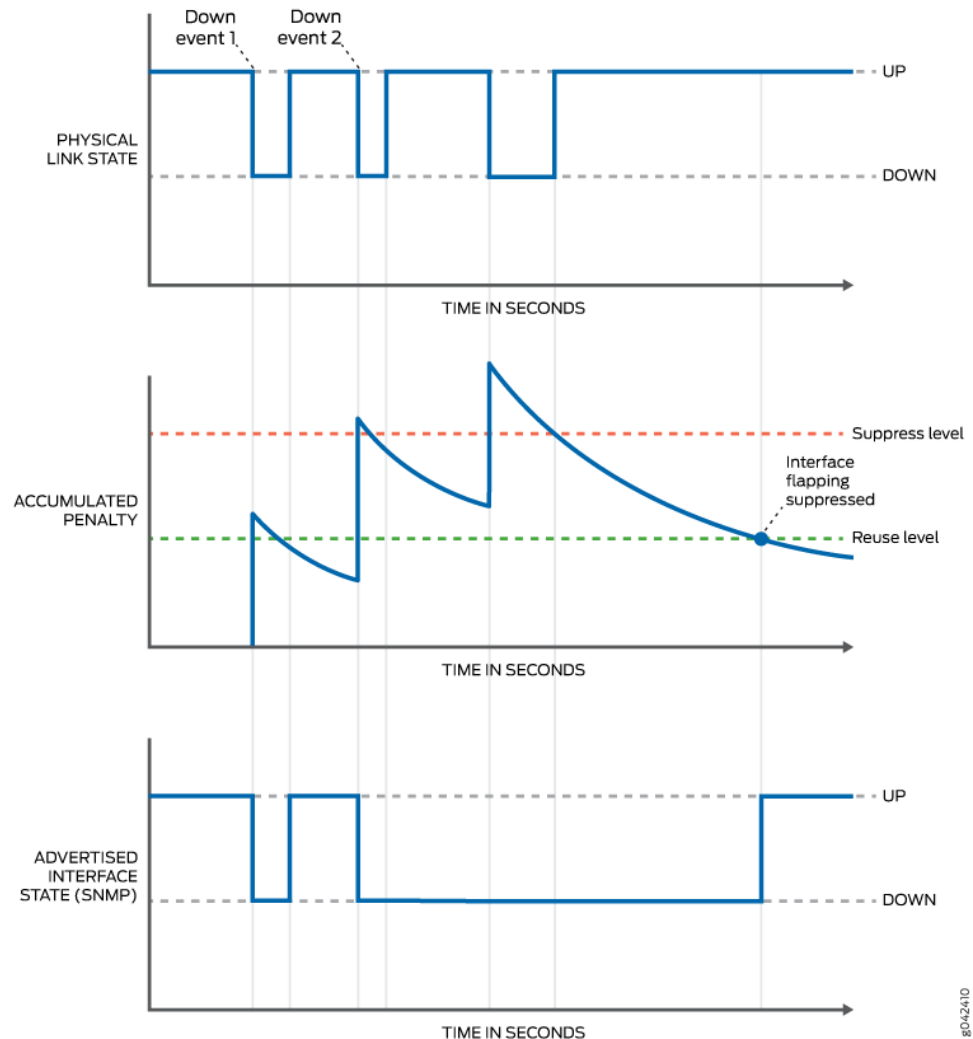


Figure 10 on page 144 shows the penalty dropping below the reuse level when the physical link is up. The system is notified of a state change immediately.

Figure 10: Physical-Level Link Is Up When the Penalty Falls Below the Reuse Level



Related Documentation

- [Damping Shorter Physical Interface Transitions on page 145](#)
- [Damping Longer Physical Interface Transitions on page 146](#)
- [Understanding Damping Parameters](#)
- [damping on page 473](#)
- [hold-time on page 577](#)

Damping Shorter Physical Interface Transitions

By default, when an interface changes from being up to being down, or from down to up, this transition is advertised immediately to the hardware and Junos OS. In some situations—for example, when an interface is connected to an add/drop multiplexer (ADM) or wavelength-division multiplexer (WDM), or to protect against SONET/SDH framer holes—you might want to damp interface transitions. This means not advertising the interface's transition until a certain period of time has passed, called the *hold-time*. When you have damped interface transitions and the interface goes from up to down, the down hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still *down*, then the router begins to advertise the interface as being down. Similarly, when an interface goes from down to up, the up hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still *up*, then the router begins to advertise the interface as being up. For information about physical interface damping, see [“Physical Interface Damping Overview” on page 139](#).

This task applies to damping shorter physical interface transitions in milliseconds. To damp longer physical interface transitions in seconds, see [“Damping Longer Physical Interface Transitions” on page 146](#).

To configure damping of shorter physical interface transitions:

1. Select the interface to damp, where the interface name is *interface-type-fpc/pic/port*:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the hold-time for link up and link down.

```
[edit interfaces interface-name]
user@host# set hold-time up milliseconds down milliseconds
```

The hold time can be a value from 0 through 4,294,967,295 milliseconds. The default value is 0, which means that interface transitions are not damped. Junos OS advertises the transition within 100 milliseconds of the time value you specify.

For most Ethernet interfaces, hold timers are implemented using a one-second polling algorithm. For 1-port, 2-port, and 4-port Gigabit Ethernet interfaces with small form-factor pluggable transceivers (SFPs), hold timers are interrupt-driven.



NOTE: The hold-time option is not available for controller interfaces.

Related Documentation

- [Physical Interface Damping Overview on page 139](#)
- [Damping Longer Physical Interface Transitions on page 146](#)
- [SONET/SDH Defect Hold Times for Damping Interface Transitions Overview](#)
- [Configuring SONET/SDH Defect Triggers](#)
- [hold-time on page 577](#)

Damping Longer Physical Interface Transitions

Physical interface damping limits the advertisement of the up and down transitions (flapping) on an interface. An unstable link between a router interface and the transport devices can lead to periodic flapping. Longer flaps occur with a period of about five seconds or more, with an up-and-down duration of one second. For these longer periodic interface flaps, you configure interface damping with the **damping** statement on the interface. This damping method uses an exponential back-off algorithm to suppress interface up and down event reporting to the upper-level protocols. Every time an interface goes down, a penalty is added to the interface penalty counter. If at some point the accumulated penalty exceeds the suppress level **max-suppress**, the interface is placed in the suppress state, and further interface state up and down transitions are not reported to the upper-level protocols.



NOTE:

- Only PTX Series routers, T Series routers, MX960 routers, MX480 routers, MX240 routers, MX80 routers, and M10i routers support interface damping for longer periodic interface flaps.
- The system does not indicate whether an interface is down because of suppression or that is the actual state of the physical interface. Because of this, SNMP link traps and Operation, Administration, and Maintenance (OAM) protocols cannot differentiate the damped version of the link state from the real version. Therefore, the traps and protocols might not work as expected.
- You can verify suppression by viewing the information in the Damping field of the **show interface extensive** command output.

You can view the damping parameters with the **show interfaces extensive** command.

To configure damping of longer physical interface transitions:

1. Select the interface to damp, where the interface name is *interface-type-fpc/pic/port* or an interface range:

```
[edit]
user@host# edit interfaces interface-name
```

2. Enable longer interface transition damping on a physical interface:

```
[edit interfaces interface-name damping]
user@host# set enable
```

3. (Optional) Set the maximum time in seconds that an interface can be suppressed no matter how unstable the interface has been.



NOTE: Configure **max-suppress** to a value that is greater than the value of **half-life**; otherwise, the configuration is rejected.

```
[edit interfaces interface-name damping]
user@host# set max-suppress maximum-seconds
```

4. (Optional) Set the decay half-life in seconds, which is the interval after which the accumulated interface penalty counter is reduced by half if the interface remains stable.



NOTE: Configure `max-suppress` to a value that is greater than the value of `half-life`; otherwise, the configuration is rejected.

```
[edit interfaces interface-name damping]
user@host# set half-life seconds
```

5. (Optional) Set the reuse threshold (no units). When the accumulated interface penalty counter falls below this value, the interface is no longer suppressed.

```
[edit interfaces interface-name damping]
user@host# set reuse number
```

6. (Optional) Set the suppression threshold (no units). When the accumulated interface penalty counter exceeds this value, the interface is suppressed.

```
[edit interfaces interface-name damping]
user@host# set suppress number
```

Related Documentation

- [Physical Interface Damping Overview on page 139](#)
- [show interfaces extensive on page 1293](#)
- [Damping Shorter Physical Interface Transitions on page 145](#)
- [damping on page 473](#)

Example: Configuring Physical Interface Damping

This example shows how to configure damping for a physical interface on a PTX Series Packet Transport Router.

- [Requirements on page 147](#)
- [Overview on page 148](#)
- [Configuration on page 148](#)
- [Verification on page 149](#)

Requirements

This example uses the following hardware and software components:

- One PTX Series Packet Transport Router
- One or more routers that provide input packets and receive output packets
- Junos OS Release 14.1 or later

Overview

Physical interface damping provides a smoothing of the up and down transitions (flapping) on an interface. Each time a transition occurs, the interface state is changed, which generates an advertisement to the upper-level routing protocols. Damping helps reduce the number of these advertisements.

From the viewpoint of network deployment, physical interface flaps fall into these categories:

- Nearly instantaneous multiple flaps of short duration (milliseconds). For shorter physical interface transitions, you configure interface damping with the **hold-time** statement on the interface. The hold timer enables interface damping by not advertising interface transitions until the hold timer duration has passed. When a hold-down timer is configured and the interface goes from up to down, the interface is not advertised to the rest of the system as being down until it has remained down for the hold-down timer period. Similarly, when a hold-up timer is configured and an interface goes from down to up, it is not advertised as being up until it has remained up for the hold-up timer period.
- Periodic flaps of long duration (seconds). For longer periodic interface flaps, you configure interface damping with the **damping** statement on the interface. This damping method uses an exponential back-off algorithm to suppress interface up and down event reporting to the upper-level protocols. Every time an interface goes down, a penalty is added to the interface penalty counter. If at some point the accumulated penalty exceeds the suppress level, the interface is placed in the suppress state, and further interface state up transitions are not reported to the upper-level protocols.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces xe-6/0/0 damping half-life 11 max-suppress 2222 reuse 3333 suppress 4444
```

Step-by-Step Procedure

To configure damping on the PTX Series Packet Transport Router:

1. Enable damping on the interface, set the half-life interval, maximum suppression, reuse, and suppress values:

```
[edit interface]
user@router# set xe-6/0/0 damping half-life 11 max-suppress 2222 reuse 3333 suppress 4444
```

2. Commit configuration:

```
[edit]
user@router# commit
```

Results

From configuration mode, confirm your configuration by entering the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@router# show interfaces
xe-6 {
  damping {
    half-life 11;
    max-suppress 2222;
    reuse 3333;
    suppress 4444;
  }
}
```

Verification

To confirm that the configuration is working properly, perform this task:

- [Verifying Interface Damping on xe6 on page 149](#)

Verifying Interface Damping on xe6

Purpose Verify that damping is enabled on the interface and that the damping parameter values are correctly set.

Action From operational mode, run the **show interfaces extensive** command.

```
user@router# run show interfaces xe-6/0/0 extensive
Physical interface: xe-6/0/0, Enabled, Physical link is Up
  Interface index: 158, SNMP ifIndex: 535, Generation: 161
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:
None, Loopback: None,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : None
  CoS queues    : 8 supported, 8 maximum usable queues
  Hold-times    : Up 0 ms, Down 0 ms
  Damping       : half-life: 11 sec, max-suppress: 2222 sec, reuse: 3333,
suppress: 4444, state: unsuppressed
```

Meaning Damping is enabled and configured successfully on the xe-6 interface.

Related Documentation

- [Physical Interface Damping Overview on page 139](#)
- [damping on page 473](#)

Configuring Multiservice Physical Interface Properties

The adaptive services (AS), collector, monitoring services, and monitoring services II interfaces are multiservice interfaces specifically designed to enable IP services. To

configure multiservice physical interface properties on the collector, monitoring services, and AS interfaces, include the **multiservice-options** statement:

```
multiservice-options {  
  (core-dump | no-core-dump);  
  (syslog | no-syslog);  
  flow-control-options {  
    down-on-flow-control;  
    dump-on-flow-control;  
    reset-on-flow-control;  
  }  
}
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *cp-fpc/pic/port*]
- [edit interfaces *mo-fpc/pic/port*]
- [edit interfaces *sp-fpc/pic/port*]

For more information about the services interfaces, see the *Junos OS Services Interfaces Library for Routing Devices*.

Enabling or Disabling SNMP Notifications on Physical Interfaces

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. You can enable or disable these notification based on you requirements.

To explicitly enable sending SNMP notifications on the physical interface, perform the following steps:

1. In configuration mode, go to the [edit interfaces *interface-name*] hierarchy level:

```
[edit]  
user@host# edit interfaces interface-name
```

2. Configure the **traps** option to enable sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.

```
[edit interfaces interface-name]  
user@host# set traps
```

To disable sending SNMP notifications on the physical interface, perform the following steps:

1. In configuration mode, go to the [edit interfaces *interface-name*] hierarchy level:

```
[edit]  
user@host# edit interfaces interface-name
```

2. Configure the **no-traps** option to disable sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.

```
[edit interfaces interface-name]  
user@host# set no-traps
```


Related Documentation • [traps on page 901](#)

Configuring Accounting for the Physical Interface

- [Accounting Profiles Overview on page 151](#)
- [Configuring Accounting for the Physical Interface on page 151](#)
- [Displaying Accounting Profile for the Physical Interface on page 152](#)

Accounting Profiles Overview

Juniper Networks routers and switches can collect various kinds of data about traffic passing through the router and switch. You can set up one or more *accounting profiles* that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file
- The polling period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the **[edit accounting-options]** hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the **interface-profile** statement at the **[edit accounting-options]** hierarchy level. You configure filter profiles by including the **filter-profile** statement at the **[edit accounting-options]** hierarchy level. For more information, see the *Network Management Administration Guide for Routing Devices*.

You apply filter profiles by including the **accounting-profile** statement at the **[edit firewall filter filter-name]** and **[edit firewall family filter filter-name]** hierarchy levels. For more information, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

Configuring Accounting for the Physical Interface

Before you begin

You must configure a profile to collect error and statistic information for input and output packets on a particular physical interface. An accounting profile specifies what statistics should be collected and written to a log file. For more information on how to configure an accounting-data log file, see the *Configuring Accounting-Data Log Files*.

An interface profile specifies the information collected and written to a log file. You can configure a profile to collect error and statistic information for input and output packets on a particular physical interface.

1. To configure which statistics should be collected for an interface, include the **fields** statement at the **[edit accounting-options interface-profile profile-name]** hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set fields field-name
```

- Each accounting profile logs its statistics to a file in the `/var/log` directory. To configure which file to use, include the `file` statement at the `[edit accounting-options interface-profile profile-name]` hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set file filename
```



NOTE: You must specify a `file` statement for the interface profile that has already been configured at the `[edit accounting-options]` hierarchy level. For more information, see the [Configuring Accounting-Data Log Files](#)

- Each interface with an accounting profile enabled has statistics collected once per interval time specified for the accounting profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the `interval` statement at the `[edit accounting-options interface-profile profile-name]` hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set interval minutes
```



NOTE: The minimum interval allowed is 1 minute. Configuring a low interval in an accounting profile for a large number of interfaces might cause serious performance degradation.

- To configure the interfaces on which the accounting needs to be performed, apply the interface profile to a physical interface by including the `accounting-profile` statement at the `[edit interfaces interface-name]` hierarchy level.

```
[edit interfaces]
user@host# set interface-name accounting-profile profile-name
```

Displaying Accounting Profile for the Physical Interface

Purpose To display the configured accounting profile a particular physical interface at the `[edit accounting-options interface-profile profile-name]` hierarchy level:

- interface-name—`ge-1/0/1`
- Interface profile —`if_profile`
- File name—`if_stats`
- Interval—15 minutes

Action • Run the `show` command at the `[edit edit interfaces ge-1/0/1]` hierarchy level.

```
[edit interfaces ge-1/0/1]
accounting-profile if_profile;
```

- Run the `show` command at the `[edit accounting-options]` hierarchy level.

```

interface-profile if_profile {
  interval 15;
  file if_stats {
    fields {
      input-bytes;
      output-bytes;
      input-packets;
      output-packets;
      input-errors;
      output-errors;
    }
  }
}

```

Meaning The configured accounting and its associated set options are displayed as expected.

Disabling a Physical Interface

- [Disabling a Physical Interface on page 153](#)
- [Example: Disabling a Physical Interface on page 154](#)
- [Effect of Disabling Interfaces on T series PICs on page 154](#)

Disabling a Physical Interface

You can disable a physical interface, marking it as being down, without removing the interface configuration statements from the configuration.



CAUTION: Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.

To disable a physical interface:

1. In configuration mode, go to **[edit interfaces *interface-name*]** hierarchy level.

```

[edit]
user@host# edit interfaces ge-fpc/pic/port

```

2. Include the **disable** statement.

```

[edit interfaces at-fpc/pic/port ]
user@host# set disable

```



NOTE: On the router, when you use the `disable` statement at the `edit interfaces` hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet PICs with SFP and XFP transceivers do support it and the laser will be turned off when the interface is disabled.



WARNING: Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

Example: Disabling a Physical Interface

Sample interface configuration:

```
[edit interfaces]
user@host# show
ge-0/3/2 {
  unit 0 {
    description CE2-to-PE1;
    family inet {
      address 20.1.1.6/24;
    }
  }
}
```

Disabling the interface:

```
[edit interfaces ge-0/3/2]
user@host# set disable
```

Verifying the interface configuration:

```
[edit interfaces ge-0/3/2]
user@host# show
disable; # Interface is marked as disabled.
unit 0 {
  description CE2-to-PE1;
  family inet {
    address 20.1.1.6/24;
  }
}
```

Effect of Disabling Interfaces on T series PICs

The following table describes the effect of using the `set interfaces disable interface_name` statement on T series PICs.

Table 40: Effect of set interfaces disable <interface_name> on T series PICs

PIC Model Number	PIC Description	Type of PIC	Behaviour
PF-12XGE-SFPP	10-Gigabit Ethernet LAN/WAN PIC with SFP+ (T4000 Router)	5	Tx laser disabled
PF-24XGE-SFPP	10-Gigabit Ethernet LAN/WAN PIC with Oversubscription and SFP+ (T4000 Router)	5	Tx laser disabled
PF-1CGE-CFP	100-Gigabit Ethernet PIC with CFP (T4000 Router)	5	Tx laser disabled
PD-4XGE-XFP	10-Gigabit Ethernet, 4-port LAN/WAN XFP	4	Tx laser disabled
PD-5-10XGE-SFPP	10-Gigabit LAN/WAN with SFP+	4	Tx laser disabled
PD-1XLE-CFP	40-Gigabit with CFP	4	Tx laser disabled
PD-1CE-CFP-FPC4	100-Gigabit with CFP	4	Tx laser disabled
PD-TUNNEL	40-Gigabit Tunnel Services	4	NA
PD-4OC192-SON-XFP	OC192/STM64, 4-port XFP	4	Tx laser not disabled
PD-1OC768-SON-SR	OC768c/STM256, 1-port	4	Tx laser not disabled

Related Documentation • [disable on page 494](#)

CHAPTER 3

Configuring Logical Interface Properties

- [Logical Interfaces Configuration Properties Overview on page 157](#)
- [Logical Interfaces Configuration Statements on page 158](#)
- [Logical Interfaces Statements List on page 161](#)
- [Specifying the Logical Interface Number on page 168](#)
- [Adding a Logical Unit Description to the Configuration on page 168](#)
- [Configuring the Interface Bandwidth on page 169](#)
- [Configuring Interface Encapsulation on Logical Interfaces on page 170](#)
- [Configuring Interface Encapsulation on PTX Series Packet Transport Routers on page 172](#)
- [Configuring a Point-to-Point Connection on page 173](#)
- [Configuring a Multipoint Connection on page 173](#)
- [Configuring the PPP Restart Timers on page 173](#)
- [Configuring the PPP Clear Loop Detected Timer on page 174](#)
- [Configuring the LCP Configure-Request Maximum Sent on page 174](#)
- [Configuring the NCP Configure-Request Maximum Sent on page 175](#)
- [Configuring Dynamic Profiles for PPP on page 175](#)
- [Configuring PPP CHAP Authentication on page 176](#)
- [Configuring the PPP Password Authentication Protocol On a Logical Interface on page 176](#)
- [Configuring Accounting for the Logical Interface on page 178](#)
- [Enabling or Disabling SNMP Notifications on Logical Interfaces on page 180](#)
- [Disabling a Logical Interface on page 180](#)
- [Configuring Logical System Interface Properties on page 181](#)

Logical Interfaces Configuration Properties Overview

For a physical interface device to function, you must configure at least one logical interface on that device. For each logical interface, you must specify the protocol family that the interface supports. You can also configure other logical interface properties. These vary by Physical Interface Card (PIC) and encapsulation type, but include the IP address of the interface, and whether the interface supports multicast traffic, data-link connection

identifiers (DLCIs), virtual channel identifiers (VCIs) and virtual path identifiers (VPIs), and traffic shaping.

Related Documentation • [Logical Part of an Interface Name on page 33](#)

Logical Interfaces Configuration Statements

To configure logical interface properties, include the following statements:

```
unit logical-unit-number {
  accept-source-mac {
    mac-address mac-address {
      policer {
        input cos-policer-name;
        output cos-policer-name;
      }
    }
  }
  accounting-profile name;
  allow-any-vci;
  atm-scheduler-map (map-name | default);
  backup-options {
    interface interface-name;
  }
  bandwidth rate;
  cell-bundle-size cells;
  clear-dont-fragment-bit;
  compression {
    rtp {
      f-max-period number;
      queues [ queue-numbers ];
      port {
        minimum port-number;
        maximum port-number;
      }
    }
  }
  compression-device interface-name;
  copy-tos-to-outer-ip-header;
  demux-destination family;
  demux-source family;
  demux-options {
    underlying-interface interface-name;
  }
  description text;
  interface {
    l2tp-interface-id name;
    (dedicated | shared);
  }
  dialer-options {
    activation-delay seconds;
    callback;
    callback-wait-period time;
    deactivation-delay seconds;
```



```

dial-string [ dial-string-numbers ];
idle-timeout seconds;
incoming-map {
    caller (caller-id| accept-all);
    initial-route-check seconds;
    load-interval seconds;
    load-threshold number;
    pool pool-name;
    redial-delay time;
    watch-list {
        [ routes ];
    }
}
}
disable;
disable-mlppp-inner-ppp-pfc;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
    activation-priority priority;
    bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold plp1 cells;
filter filter-name;
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
input-vlan-map {
    inner-tag-protocol-id;
    inner-vlan-id;
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    tag-protocol-id tpid;
    vlan-id number;
}
interleave-fragments;
inverse-arp;
link-layer-overhead percent;
layer2-policer {
    input-policer policer-name;
    input-three-color policer-name;
    output-policer policer-name;
    output-three-color policer-name;
}
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
    up-count cells;
    down-count cells;
}
oam-period (seconds | disable);
output-vlan-map {
    inner-tag-protocol-id;

```

```

    inner-vlan-id;
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    tag-protocol-id tpid;
    vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
    chap {
        access-profile name;
        default-chap-secret name;
        local-name name;
        passive;
    }
    compression {
        acfc;
        pfc;
    }
    dynamic-profile profile-name;
    lcp-restart-timer milliseconds;
    loopback-clear-timer seconds;
    ncp-restart-timer milliseconds;
    pap {
        default-pap-password password;
        local-name name;
        local-password password;
        passive;
    }
}
pppoe-options {
    access-concentrator name;
    auto-reconnect seconds;
    (client | server);
    service-name name;
    underlying-interface interface-name;
}
proxy-arp;
service-domain (inside | outside);
shaping {
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst length);
    queue-length number;
}
short-sequence;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
    backup-destination address;
    destination address;
    key number;
    routing-instance {
        destination routing-instance-name;
    }
}

```

```

    source source-address;
    ttl number;
}
vci vpi-identifier.vci-identifier;
vci-range start start-vci end end-vci;
vpi vpi-identifier;
vlan-id number;
vlan-id-range number-number;
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
family family {
    [ family-statements ];
}
}

```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name*]
- [edit logical-systems *logical-system-name* interfaces *interface-name*]

For information about interface-specific logical properties, see [Table 41 on page 161](#).

Logical Interfaces Statements List

[Table 41 on page 161](#) lists statements that you can use to configure logical interfaces.

Table 41: Statements for Logical Interface Properties

Statement	Interface Types	Usage Guidelines
<code>access-profile name</code>	ATM2 IQ interfaces	"Configuring the PPP Password Authentication Protocol On a Logical Interface" on page 176
<code>accept-source-mac</code>	Gigabit Ethernet intelligent queuing (IQ) interfaces	<i>Configuring Gigabit Ethernet Policers</i>
<code>accounting-profile name</code>	All	"Configuring Accounting for the Logical Interface" on page 178
<code>activation-delay seconds</code>	ISDN interfaces	<i>ISDN Interfaces Overview</i>
<code>allow-any-vci</code>	Asynchronous Transfer Mode (ATM) interfaces	<i>Configuring ATM Interface Encapsulation</i>
<code>atm-scheduler-map (map-name default)</code>	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>backup-destination address</code>	Encryption interfaces	<i>Class of Service Feature Guide for Routing Devices</i>
<code>bandwidth rate</code>	All interfaces, except multilink and aggregated	"Configuring the Interface Bandwidth" on page 169

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>cbr rate</code>	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
<code>cell-bundle-size cells</code>	ATM2 IQ interfaces	<i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum Overview</i>
<code>clear-dont-fragment-bit</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>compression</code>	AS PIC or MultiServices PIC link services IQ interfaces (lsq) and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>copy-tos-to-outer-ip-header</code>	GRE tunnel interfaces	<i>Class of Service Feature Guide for Routing Devices</i>
<code>deactivation-delay seconds</code>	ISDN interfaces	<i>ISDN Interfaces Overview</i>
<code>demux-destination family</code>	IP demux interfaces	"Configuring an IP Demultiplexing Interface" on page 276
<code>demux-options family</code>	IP demux interfaces	"Configuring an IP Demultiplexing Interface" on page 276
<code>demux-source family</code>	IP demux interfaces	"Configuring an IP Demultiplexing Interface" on page 276
<code>description text</code>	All	"Adding a Logical Unit Description to the Configuration" on page 168
<code>destination (address routing-instance-name)</code>	Encryption generic routing encapsulation (GRE) tunnel, and IP tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>disable</code>	All	"Disabling a Logical Interface" on page 180
<code>disable-mlppp-inner-ppp-pfc</code>	MLPPP interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>dlci dlci-identifier</code>	Point-to-point interfaces with Frame Relay encapsulation	<i>Configuring Frame Relay DLCIs</i>
<code>drop-timeout milliseconds</code>	Multilink interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>dynamic-profile profile-name</code>	1-Gigabit Ethernet and 10-Gigabit Ethernet interfaces configured with PPP over Ethernet on M120 and M320 routers	<i>Junos Subscriber Access Configuration Guide</i>
<code>encapsulation type</code>	All interfaces, except aggregated SONET/SDH and loopback	"Configuring Interface Encapsulation on Logical Interfaces" on page 170

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>epd-threshold cells</code>	ATM2 IQ interfaces	<i>Configuring the ATM2 IQ EPD Threshold</i>
<code>f-max-period number</code>	AS PIC or MultiServices link services IQ interfaces (lsq-) and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>family</code>	All	"Configuring the Protocol Family" on page 186
<code>fragment-threshold bytes</code>	Multilink interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>idle-timeout</code>	ISDN interfaces	<i>Configuring ISDN Logical Interface Properties</i>
<code>initial-route-check seconds</code>	ISDN interfaces	<i>Configuring ISDN Logical Interface Properties</i>
<code>inner-tag-protocol-id</code>	Gigabit Ethernet IQ interfaces	<i>802.1Q VLANs Overview</i>
<code>inner-vlan-id</code>	Gigabit Ethernet IQ interfaces	<i>802.1Q VLANs Overview</i>
<code>inner-vlan-id-range</code>	Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet IQ interfaces	"Configuring ATM-to-Ethernet Interworking" on page 254
<code>input</code>	AS PIC or MultiServices link services	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>input-policer policer-name</code>	For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers	<i>Junos OS Services Interfaces Library for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>
<code>input-three-color policer-name</code>	For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers	<i>Class of Service Feature Guide for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>
<code>input-vlan-map</code>	Gigabit Ethernet IQ interfaces	<i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>
<code>interleave-fragments</code>	Link services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>inverse-arp</code>	Interfaces with ATM and Frame Relay encapsulation	<i>Configuring Inverse ATM1 or ATM2 ARP and Configuring Inverse Frame Relay ARP</i>
<code>key number</code>	GRE tunnel interfaces on Adaptive Services PICs	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>layer2-policer</code>	1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces	<i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>lcp-restart-timer</code>	Interfaces with PPP encapsulation	“Configuring the PPP Restart Timers” on page 173
<code>l2tp-interface-id name</code>	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>link-layer-overhead percent</code>	AS PIC or MultiServices link services IQ interfaces (lsq)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>load-threshold number</code>	ISDN interfaces	<i>Configuring ISDN Logical Interface Properties</i>
<code>local-name name</code>	ATM2 IQ interfaces	“Configuring PPP CHAP Authentication” on page 176 and “Configuring the PPP Password Authentication Protocol On a Logical Interface” on page 176
<code>mac-address mac-address</code>	Gigabit Ethernet interfaces and Gigabit Ethernet IQ and IQE interfaces with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
<code>minimum-links number</code>	Multilink interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>mrru bytes</code>	Multilink interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>multicast-dlci dlci-identifier</code>	Point-to-multipoint Frame Relay interfaces	<i>Configuring Frame Relay DLCIs</i>
<code>multicast-vci vpi-identifier vci-identifier</code>	Point-to-multipoint ATM1 and ATM2 IQ interfaces	<i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>
<code>multilink-max-classes number</code>	AS PIC or MultiServices link services IQ interfaces (lsq-)	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>multipoint</code>	All	“Configuring a Multipoint Connection” on page 173
<code>ncp-restart-timer</code>	Interfaces with PPP encapsulation	“Configuring the PPP Restart Timers” on page 173
<code>oam-liveness</code>	ATM1 and ATM2 IQ interfaces	<i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>
<code>oam-period (disable seconds)</code>	ATM1 and ATM2 IQ interfaces	<i>Defining the ATM OAM F5 Loopback Cell Period</i>

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>output</code>	All	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>output-policer</code> <i>policer-name</i>	For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers	<i>Class of Service Feature Guide for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>
<code>output-three-color</code> <i>policer-name</i>	For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers	<i>Class of Service Feature Guide for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>
<code>output-vlan-map</code>	Gigabit Ethernet IQ interfaces	<i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>
<code>passive</code> (CHAP)	ATM2 IQ interfaces	“Configuring PPP CHAP Authentication” on page 176
<code>passive</code> (PAP)	ATM2 IQ interfaces	“Configuring the PPP Password Authentication Protocol On a Logical Interface” on page 176
<code>passive-monitor-mode</code>	SONET/SDH interfaces	<i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i>
<code>peer-unit</code> <i>unit-number</i>	Logical tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>pfc</code>	Interfaces with PPP, PPP CCC, or PPP TCC encapsulation	“Configuring the PPP Protocol Field Compression” on page 131
<code>plp1</code> <i>cells</i>	ATM2 IQ interfaces	<i>Configuring the ATM2 IQ EPD Threshold</i>
<code>plp-to-clp</code>	ATM2 IQ interfaces	<i>ATM2 IQ VC Tunnel CoS Components Overview</i>
<code>point-to-point</code>	All	“Configuring a Point-to-Point Connection” on page 173
<code>policer</code>	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router)	<i>Configuring Gigabit Ethernet Policers</i>
<code>pop</code>	Gigabit Ethernet IQ interfaces	<i>Removing a VLAN Tag</i>
<code>pop-pop</code>	Gigabit Ethernet IQ interfaces	<i>Removing the Outer and Inner VLAN Tags</i>
<code>pop-swap</code>	Gigabit Ethernet IQ interfaces	<i>Removing the Outer VLAN Tag and Rewriting the Inner VLAN Tag</i>

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>port</code>	AS PIC or MultiServices or MultiServices link services IQ interfaces (lsq) and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>ppp-options</code>	Interfaces with PPP, PPP CCC, or PPP TCC encapsulation	“Configuring PPP CHAP Authentication” on page 176 and “Configuring the PPP Password Authentication Protocol On a Logical Interface” on page 176
<code>proxy-arp</code>	Ethernet interfaces	<i>Configuring Restricted and Unrestricted Proxy ARP</i>
<code>push</code>	Gigabit Ethernet IQ interfaces	<i>Stacking a VLAN Tag</i>
<code>push-push</code>	Gigabit Ethernet IQ interfaces	<i>Stacking Two VLAN Tags</i>
<code>queue-length</code> <i>number</i>	ATM1 interfaces	<i>Configuring the ATM1 Queue Length</i>
<code>queues</code> [<i>queue-numbers</i>]	AS PIC or MultiServices link services IQ interfaces (lsq) and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>routing-instance</code>	GRE tunnel and IP tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>rtp</code>	AS PIC or MultiServices link services IQ interfaces (lsq) and voice services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>rtvbr</code> <i>peak rate</i> <i>sustained rate</i> <i>burst length</i>	ATM2 interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
<code>service-domain</code> (<i>inside</i> <i>outside</i>)	Adaptive services interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>shaping</code>	ATM1 and ATM2 IQ interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
<code>short-sequence</code>	Multilink interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>source</code> <i>source-address</i>	Encryption, GRE tunnel, and IP tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>swap</code>	Gigabit Ethernet IQ interfaces	<i>Configuring Frames with Particular TPIDs to Be Processed as Tagged Frames</i>
<code>swap-push</code>	Gigabit Ethernet IQ interfaces	<i>Rewriting a VLAN Tag and Adding a New Tag</i>

Table 41: Statements for Logical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>swap-swap</code>	Gigabit Ethernet IQ interfaces	<i>Rewriting the Inner and Outer VLAN Tags</i>
<code>tag-protocol-id</code> <i>tpid</i>	Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, Aggregated Ethernet with Gigabit Ethernet IQ interfaces, and the built-in Gigabit Ethernet port on the M71 router)	<i>Rewriting the VLAN Tag on Tagged Frames</i>
<code>transmit-weight</code> <i>number</i>	ATM2 IQ interfaces	<i>Configuring the ATM2 IQ Transmission Weight</i>
<code>(traps no-traps)</code>	All	“Enabling or Disabling SNMP Notifications on Logical Interfaces” on page 180
<code>trunk-bandwidth</code> <i>rate</i>	ATM2 IQ interfaces	<i>Configuring Layer 2 Circuit Trunk Mode Scheduling Overview</i>
<code>trunk-id</code> <i>number</i>	ATM2 IQ interfaces	<i>Configuring Layer 2 Circuit Transport Mode</i>
<code>ttl</code> <i>number</i>	GRE tunnel and IP tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>tunnel</code>	Encryption, GRE tunnel, and IP tunnel interfaces	<i>Junos OS Services Interfaces Library for Routing Devices</i>
<code>underlying-interface</code>	IP demux interfaces	“Configuring an IP Demultiplexing Interface” on page 276
<code>vbr</code> <i>peak rate sustained rate burst length</i>	ATM interfaces	<i>Defining the ATM Traffic-Shaping Profile Overview</i>
<code>vci</code> <i>vpi-identifier vci-identifier</i>	ATM1 and ATM2 IQ point-to-point interfaces	<i>Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</i>
<code>vci-range</code>	ATM2 IQ interfaces	“Configuring ATM-to-Ethernet Interworking” on page 254
<code>vpi</code> <i>vpi-identifier</i>	ATM1 and ATM2 IQ point-to-point interfaces	<i>Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</i>
<code>vlan-id</code> <i>number</i>	Fast Ethernet, Gigabit Ethernet, and Gigabit Ethernet IQ interfaces and aggregated Ethernet using Gigabit Ethernet IQ interfaces	<i>Binding VLAN IDs to Logical Interfaces and Rewriting the VLAN Tag on Tagged Frames</i>
<code>vlan-tags</code> <i>inner tpidvlan-id outer tpidvlan-id</i>	Gigabit Ethernet IQ interfaces	<i>Configuring Dual VLAN Tags</i>
<code>watch-list</code>	ISDN interfaces	<i>Configuring ISDN Logical Interface Properties</i>

Related Documentation

- *Logical Interfaces Feature Guide for Routing Devices*

Specifying the Logical Interface Number

Each logical interface must have a logical unit number. The logical unit number corresponds to the logical unit part of the interface name. For more information, see [“Interface Naming Overview” on page 27](#).

Point-to-Point Protocol (PPP), Cisco High-level Data Link Control (HDLC), and Ethernet circuit cross-connect (CCC) encapsulations support only a single logical interface, whose logical unit number must be 0. Frame Relay and ATM encapsulations support multiple logical interfaces, so you can configure one or more logical unit numbers.

You specify the logical unit number by including the **unit** statement:

```
unit logical-unit-number {  
    ...  
}
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name*]**

The logical unit number can be in the range 0 through 65,535 for demux and PPPoE static interfaces only. The logical unit number can be in the range 0 through 16,385 for all other static interface types.

Adding a Logical Unit Description to the Configuration

You can include a text description of each logical unit in the configuration file. Any descriptive text you include is displayed in the output of the **show interfaces** commands, and is also exposed in the **ifAlias** Management Information Base (MIB) object. It has no impact on the interface's configuration. To add a text description, include the **description** statement:

```
description text;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.



NOTE: You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See “*Using DHCP Relay Agent Option 82 Information*” in the *Junos OS Broadband Subscriber Management and Services Library*.

For information about describing physical interfaces, see “[Configuring Interface Description](#)” on page 102.

Configuring the Interface Bandwidth

By default, the Junos OS uses the physical interface’s speed for the MIB-II object, **ifSpeed**. You can configure the logical unit to populate the **ifSpeed** variable by configuring a bandwidth value for the logical interface. The **bandwidth** statement sets an informational-only parameter; you cannot adjust the actual bandwidth of an interface with this statement.



NOTE: We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the **bandwidth** statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:

$$\text{cost} = \text{reference-bandwidth} / \text{bandwidth},$$

where bandwidth is the physical interface speed. However, if you specify a value for bandwidth using the **bandwidth** statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.

To configure the bandwidth value for a logical interface, include the **bandwidth** statement:

bandwidth *rate*;

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

rate is the peak rate, in bps or cps. You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation **k** (1000), **m** (1,000,000), or **g** (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation **c**; values expressed in cells per second are converted to bits per second using the formula 1 cps = 384 bps. The value can be any positive integer. The **bandwidth** statement is valid for all logical interfaces, except multilink interfaces.

Configuring Interface Encapsulation on Logical Interfaces

- [Understanding Interface Encapsulation on Logical Interfaces on page 170](#)
- [Configuring the Encapsulation on a Logical Interface on page 171](#)
- [Displaying the Encapsulation on a Logical Interface on page 171](#)

Understanding Interface Encapsulation on Logical Interfaces

You can configure an encapsulation on a logical interface, which is the encapsulation used within certain packet types.

The following restrictions apply to logical interface encapsulation:

- With the atm-nlpid, atm-cisco-nlpid, and atm-vc-mux encapsulations, you can configure the inet family only.
- With the CCC circuit encapsulations, you cannot configure a family on the logical interface.
- A logical interface cannot have frame-relay-ccc encapsulation unless the physical device also has frame-relay-ccc encapsulation.
- A logical interface cannot have frame-relay-tcc encapsulation unless the physical device also has frame-relay-tcc encapsulation. In addition, you must assign this logical interface a DLCI from 512 through 1022 and configure it as point-to-point.
- A logical interface cannot have frame-relay-ether-type or frame-relay-ether-type-tcc encapsulation unless the physical interface has flexible-frame-relay encapsulation and is on an IQ or IQE PIC.
- For frame-relay-ether-type-tcc encapsulation, you must assign this logical interface a DLCI from 512 through 1022.
- For interfaces that carry IP version 6 (IPv6) traffic, you cannot configure ether-over-atm-llc encapsulation.
- When you use ether-over-atm-llc encapsulation, you cannot configure multipoint interfaces.
- A logical interface cannot have vlan-ccc or vlan-vpls encapsulation unless the physical device also has vlan-ccc or vlan-vpls encapsulation, respectively. In addition, you must assign this logical interface a VLAN ID from 512 through 1023; if the VLAN ID is 511 or lower, it is subject to the normal destination filter lookups in addition to source address filtering. For more information, see *Configuring VLAN and Extended VLAN Encapsulation*.
- You can create an ATM cell-relay circuit by configuring an entire ATM physical device or an individual virtual circuit (VC). When you configure an entire device, only cell-relay encapsulation is allowed on the logical interfaces. For more information, see *Configuring an ATM Cell-Relay Circuit Overview*.

Configuring the Encapsulation on a Logical Interface

Generally, you configure an interface's encapsulation at the `[edit interfaces interface-name]` hierarchy level. However, for some encapsulation types, such as Frame Relay, ATM, and Ethernet virtual local area network (VLAN) encapsulations, you can also configure the encapsulation type that is used inside the Frame Relay, ATM, or VLAN circuit itself.

To configure encapsulation on a logical interface:

1. In configuration mode, go to the `[edit interfaces interface-name unit logical-unit-number]` or `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]` hierarchy level.

```
[edit]
user@host# set interfaces at-fpc/pic/port unit logical-unit-number
```

2. Configure the encapsulation type as described in [encapsulation \(Logical Interface\)](#).

```
[edit interfaces at-fpc/pic/port unit logical-unit-number]
user@host# set encapsulation encapsulation-type
```

Displaying the Encapsulation on a Logical Interface

Purpose To display the configured encapsulation and its associated set options on a physical interface when the following are set at the `[edit interfaces interface-name]` or `[edit logical-systems logical-system-name interfaces interface-name]` hierarchy level:

- interface-name—at-1/1/0
- Encapsulation—atm-ccc-cell-relay
- Unit—120

Action Run the `show` command at the `[edit interfaces interface-name]` hierarchy level.

```
[edit interfaces at-1/1/0]
user@host# show
encapsulation atm-ccc-cell-relay;
unit 120 {
  encapsulation atm-ccc-cell-relay;
}
```

Meaning The configured encapsulation and its associated set options are displayed as expected.

Related Documentation

- [encapsulation \(Logical Interface\) on page 522](#)
- *Configuring VLAN and Extended VLAN Encapsulation*
- *Configuring an ATM1 Cell-Relay Circuit Overview*

Configuring Interface Encapsulation on PTX Series Packet Transport Routers

This topic describes how to configure interface encapsulation on PTX Series Packet Transport Routers. Use the **flexible-ethernet-services** configuration statement to configure different encapsulation for different logical interfaces under a physical interface. With flexible Ethernet services encapsulation, you can configure each logical interface encapsulation without range restrictions for VLAN IDs.

Supported encapsulations for physical interfaces include:

- **flexible-ethernet-services**
- **ethernet-ccc**
- **ethernet-tcc**

Supported encapsulations for logical interfaces include:

- **ethernet**
- **vlan-ccc**
- **vlan-tcc**



NOTE: PTX Series Packet Transport Routers do not support **extended-vlan-cc** and **extended-vlan-tcc** encapsulation on logical interfaces. Instead, you can configure a tag protocol ID (TPID) value of 0x9100 to achieve the same results.

To configure flexible Ethernet services encapsulation, include the **encapsulation flexible-ethernet-services** statement at the **[edit interfaces et-fpc/pic/port]** hierarchy level. For example:

```
interfaces {
  et-fpc/pic/port {
    vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 0 {
      vlan-id 1000;
      family inet {
        address 11.0.0.20/24;
      }
    }
    unit 1 {
      encapsulation vlan-ccc;
      vlan-id 1010;
    }
    unit 2 {
      encapsulation vlan-tcc;
      vlan-id 1020;
      family tcc {
        proxy {
```

```

        inet-address 11.0.2.160;
    }
    remote {
        inet-address 11.0.2.10;
    }
}
}
}
}
}

```

**Related
Documentation**

- [Configuring Interface Encapsulation on Physical Interfaces on page 117](#)

Configuring a Point-to-Point Connection

By default, all interfaces are assumed to be point-to-point connections. You must ensure that the maximum transmission unit (MTU) sizes on both sides of the connection are the same.

For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, you can explicitly configure an interface to be a point-to-point connection by including the **point-to-point** statement:

```
point-to-point;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

Configuring a Multipoint Connection

By default, all interfaces are assumed to be point-to-point connections. To configure an interface to be a multipoint connection, include the **multipoint** statement:

```
multipoint;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

Configuring the PPP Restart Timers

You can configure a restart timer for the Link Control Protocol (LCP) and Network Control Protocol (NCP) components of a PPP session. You can configure the LCP restart timer on interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations. You can configure the NCP restart timer on interfaces with PPP and PPP TCC encapsulations and on multilink PPP bundle interfaces.

To configure the restart timer for the NCP component of a PPP session, include the **ncp-restart-timer** statement, and specify the number of milliseconds.

To configure the restart timer for the LCP component of a PPP session, include the **lcp-restart-timer** statement, and specify the number of milliseconds:

```
lcp-restart-timer milliseconds;  
ncp-restart-timer milliseconds;
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **PPP parameters** field for the physical interface.

```
user@host> run show interfaces t1-0/0/0:1:1.0 detail  
Logical interface t1-0/0/0:1:1.0 (Index 67) (SNMP ifIndex 40)  
(Generation 156)  
Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps 0x4000  
Encapsulation: PPP  
PPP parameters:  
  LCP restart timer: 2000 msec  
  NCP restart timer: 2000 msec  
Protocol inet, MTU: 1500, Generation: 163, Route table: 0  
Flags: Protocol-Down  
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary  
Destination: 1.1.1/24, Local: 1.1.1.2, Broadcast: 1.1.1.255,
```

Configuring the PPP Clear Loop Detected Timer

When a Point-to-Point Protocol (PPP) session detects a loop, the loop detected flag is set. If the flag is not cleared by the protocol after the loopback is cleared, the clear loop detected timer clears the flag after the specified time has elapsed.

To configure the clear loop detected timer for the LCP component of a PPP session, include the **loopback-clear-timer** statement, and specify the number of seconds.

```
loopback-clear-timer seconds;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]

To monitor the configuration, issue the **show interfaces *interface-name* extensive** command.

Configuring the LCP Configure-Request Maximum Sent

Link Control Protocol (LCP) Configure-Request is used to establish a link. You can configure the maximum number of LCP Configure-Requests to send. The router stops

sending LCP Configure-Requests after the specified maximum number is sent. To configure the LCP Configure-Request maximum, use the **lcp-max-conf-req** statement at the **[edit interfaces *interface-name* unit *number* ppp-options]** hierarchy level. The *number* range is from 0 to 65,535; where 0 specifies no limit and the LCP Configure-Request is sent indefinitely. The default is 254.

Related Documentation

- [lcp-max-conf-req on page 632](#)

Configuring the NCP Configure-Request Maximum Sent

Network Control Protocol (NCP) Configure-Request is used to establish a link. You can configure the maximum number of NCP Configure-Requests to send. The router stops sending NCP Configure-Requests after the specified maximum number is sent. To configure the NCP Configure-Request maximum, use the **ncp-max-conf-req** statement at the **[edit interfaces *interface-name* unit *number* ppp-options]** hierarchy level. The *number* range is from 0 to 65,535; where 0 specifies no limit and NCP Configure-Request is sent indefinitely. The default is 254.

Related Documentation

- [ppp-options on page 781](#)

Configuring Dynamic Profiles for PPP

A dynamic profile acts as a template that enables you to create, update, or remove a configuration that includes attributes for client access (for example, interface or protocol) or service (for example, IGMP). Using these profiles you can consolidate all of the common attributes of a client (and eventually a group of clients) and apply the attributes simultaneously.

After they are created, the profiles reside in a profile library on the router. You can then use the **dynamic-profile** statement to attach profiles to interfaces. To assign a dynamic profile to a PPP interface, you can include the **dynamic-profile** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number ppp-options]
dynamic-profile profile-name;
```

To monitor the configuration, issue the **show interfaces *interface-name*** command.

For information about dynamic profiles, see *Dynamic Profiles Overview* in the *Junos Subscriber Access Configuration Guide*.

For information about creating dynamic profiles, see *Configuring a Basic Dynamic Profile* in the *Junos Subscriber Access Configuration Guide*.

For information about assigning a dynamic profile to a PPP interface, see *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces* in the *Junos Subscriber Access Configuration Guide*.



NOTE: Dynamic profiles for PPP subscribers are supported only on PPPoE interfaces for this release.

**Related
Documentation**

- [Configuring Dynamic Authentication for PPP Subscribers](#)

Configuring PPP CHAP Authentication

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*. When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer.

For information about configuring CHAP, see [“Configuring the PPP Challenge Handshake Authentication Protocol” on page 123](#).

Configuring the PPP Password Authentication Protocol On a Logical Interface

- [Understanding PPP Password Authentication Protocol on page 176](#)
- [Configuring the PPP Password Authentication Protocol On a Logical Interface on page 177](#)

Understanding PPP Password Authentication Protocol

The Password Authentication Protocol (PAP) provides a simple method for the peer to establish its identity using a two-way handshake. This is done only upon initial link establishment.

After the link is established, an ID and password pair is repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.

For interfaces with PPP encapsulation, you can configure interfaces to support the Password Authentication Protocol (PAP), as defined in RFC 1334, *PAP Authentication Protocols*. If authentication is configured, the PPP link negotiates using CHAP or PAP protocol for authentication during the Link Control Protocol (LCP) negotiation phase. PAP is only performed after the link establishment phase (LCP up) portion of the authentication phase.

During authentication, the PPP link sends a PAP authentication-request packet to the peer with an ID and password. The authentication-request packet is sent every 2 seconds, similar to the CHAP challenge, until a response is received (acknowledgment packet, nonacknowledgment packet). If an acknowledgment packet is received, the PPP link transitions to the next state, the network phase. If a nonacknowledgment packet is received, an LCP terminate request is sent, and the PPP link goes back to the link establishment phase. If no response is received, and an optional retry counter is set to **true**, a new request acknowledgment packet is resent. If the retry counter expires, the PPP link transitions to the LCP negotiate phase.

You can configure the PPP link with PAP in passive mode. By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring the PPP Password Authentication Protocol On a Logical Interface

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in the packet is used to look up the password. If no matching access profile is found for the PAP authentication request that was received by the interface, the optionally configured default PAP password is used.

To configure the PPP password authentication protocol, on each logical interface with PPP encapsulation, perform the following steps.

1. The default PAP password is used when no matching PAP access profile exists, or if the PAP access profile name changes during PPP link negotiation. To configure the default PAP password, include the **pap-password** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set default-pap-password password
```

2. To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
user@host# set local-name name
```



NOTE: By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

3. You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set local-password password
```

4. To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name unit logical-unt-number ppp-options pap]
user@host# set passive
```



NOTE: By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring Accounting for the Logical Interface

- [Accounting Profiles Overview on page 178](#)
- [Configuring Accounting for the Logical Interface on page 178](#)
- [Displaying Accounting Profile for the Logical Interface on page 179](#)

Accounting Profiles Overview

Juniper Networks routers and switches can collect various kinds of data about traffic passing through the router and switch. You can set up one or more *accounting profiles* that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file
- The polling period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the **[edit accounting-options]** hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the **interface-profile** statement at the **[edit accounting-options]** hierarchy level. You configure filter profiles by including the **filter-profile** statement at the **[edit accounting-options]** hierarchy level. For more information, see the *Network Management Administration Guide for Routing Devices*.

You apply filter profiles by including the **accounting-profile** statement at the **[edit firewall filter *filter-name*]** and **[edit firewall family *family filter filter-name*]** hierarchy levels. For more information, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

Configuring Accounting for the Logical Interface

Before you begin

You must configure a profile to collect error and statistic information for input and output packets on a particular logical interface. An accounting profile specifies what statistics should be collected and written to a log file. For more information on how to configure an accounting-data log file, see the *Configuring Accounting-Data Log Files*.

An interface profile specifies the information collected and written to a log file. You can configure a profile to collect error and statistic information for input and output packets on a particular logical interface.

1. To configure which statistics should be collected for an interface, include the **fields** statement at the **[edit accounting-options interface-profile *profile-name*]** hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set fields field-name
```

2. Each accounting profile logs its statistics to a file in the **/var/log** directory. To configure which file to use, include the **file** statement at the **[edit accounting-options interface-profile *profile-name*]** hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set file filename
```



NOTE: You must specify a **file** statement for the interface profile that has already been configured at the **[edit accounting-options]** hierarchy level. For more information, see the [Configuring Accounting-Data Log Files](#)

3. Each interface with an accounting profile enabled has statistics collected once per interval time specified for the accounting profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options interface-profile *profile-name*]** hierarchy level.

```
[edit accounting-options interface-profile profile-name]
user@host# set interval minutes
```



NOTE: The minimum interval allowed is 1 minute. Configuring a low interval in an accounting profile for a large number of interfaces might cause serious performance degradation.

4. To configure the interfaces on which the accounting needs to be performed, apply the interface profile to a logical interface by including the **accounting-profile** statement at the **[edit interfaces interface-name unit *logical-unit-number*]** hierarchy level.

```
[edit interfaces]
user@host# set interface-name unit logical-unit-number accounting-profile profile-name
```

Displaying Accounting Profile for the Logical Interface

Purpose To display the configured accounting profile a particular logical interface at the **[edit accounting-options interface-profile *profile-name*]** hierarchy level:

- interface-name—ge-1/0/1
- Logical unit number—1
- Interface profile —if_profile

- File name—**if_stats**
- Interval—15 minutes

Action • Run the **show** command at the **[edit interfaces ge-1/0/1 unit 1]** hierarchy level.

```
[edit interfaces ge-1/0/1 unit 1]
accounting-profile if_profile;
```

- Run the **show** command at the **[edit accounting-options]** hierarchy level.

```
interface-profile if_profile {
  interval 15;
  file if_stats {
    fields {
      input-bytes;
      output-bytes;
      input-packets;
      output-packets;
      input-errors;
      output-errors;
    }
  }
}
```

Meaning The configured accounting and its associated set options are displayed as expected.

Enabling or Disabling SNMP Notifications on Logical Interfaces

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. To explicitly enable these notifications on the logical interface, include the **traps** statement; to disable these notifications on the logical interface, include the **no-traps** statement:

```
(traps | no-traps);
```

You can include these statements at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

Disabling a Logical Interface

You can unconfigure a logical interface, effectively disabling that interface, without removing the logical interface configuration statements from the configuration. To do this, include the **disable** statement:

```
disable;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**

- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

When an interface is disabled, a route (pointing to the reserved target “REJECT”) with the IP address of the interface and a 32-bit subnet mask is installed in the routing table. See *Routing Protocols*.

Configuring Logical System Interface Properties

With Junos OS, you can partition a single physical router into multiple logical devices that perform independent routing tasks. Because logical systems perform a subset of the tasks once handled by the physical router, logical systems offer an effective way to maximize the use of a single router.

1. Configure the physical interface that needs to be partitioned into multiple logical systems.

```
[edit]
user@host# set interfaces interface-name description description
```

2. Create the logical system interface on the logical unit.

```
[edit]
user@host# set logical-systems name interfaces interface-name unit
logical-unit-number description description
```

3. Configure the required properties for the logical system.

```
[edit logical-systems name]
user@host# set interfaces interface-name unit logical-unit-number family name
address address
```

Related Documentation

- *Examples: Configuring Logical System Interfaces*
- *[edit logical-systems] Hierarchy Level*

CHAPTER 4

Configuring Protocol Family and Interface Address Properties

- [Protocol Family Configuration and Interface Address Statements on page 183](#)
- [Configuring the Protocol Family on page 186](#)
- [Configuring the Interface Address on page 187](#)
- [Configuring Default, Primary, and Preferred Addresses and Interfaces on page 189](#)
- [Configuring ICCP for MC-LAG on page 191](#)
- [Configuring IPCP Options for Interfaces with PPP Encapsulation on page 193](#)
- [Configuring an Unnumbered Interface on page 195](#)
- [Setting the Protocol MTU on page 201](#)
- [Disabling the Removal of Address and Control Bytes on page 202](#)
- [Disabling the Transmission of Redirect Messages on an Interface on page 202](#)
- [Applying Policers on page 203](#)
- [Applying a Filter to an Interface on page 212](#)
- [Configuring Unicast RPF on page 217](#)
- [Example: Configuring Unicast Reverse-Path-Forwarding Check on page 226](#)
- [Enabling Source Class and Destination Class Usage on page 235](#)
- [Understanding Targeted Broadcast on page 243](#)
- [Configuring Targeted Broadcast on page 244](#)

Protocol Family Configuration and Interface Address Statements

For each logical interface, you must configure one or more protocol families. You can also configure interface address properties. To do this, include the following statements:

```
family family {  
  accounting {  
    destination-class-usage;  
    source-class-usage {  
      direction;  
    }  
  }  
  address address {
```

```

        destination address;
    }
    bundle interface-name;
    filter {
        dialer filter-name;
        input filter-name;
        output filter-name;
        group filter-group-number;
    }
    interface-mode (access | trunk);
    ipsec-sa sa-name;
    keep-address-and-control;
    mtu bytes;
    multicast-only;
    negotiate-address;
    no-redirects;
    policer {
        arp policer-template-name;
        input policer-template-name;
        output policer-template-name;
    }
    primary;
    protocols [inet iso mpls];
    proxy inet-address address;
    receive-options-packets;
    receive-ttl-exceeded;
    remote (inet-address address | mac-address address);
    rpf-check <fail-filter filter-name>;
    sampling {
        direction;
    }
    service {
        input {
            service-set service-set-name <service-filter filter-name>;
            post-service-filter filter-name;
        }
        output {
            service-set service-set-name <service-filter filter-name>;
        }
    }
    targeted-broadcast {
        forward-and-send-to-re;
        forward-only;
    }
    (translate-discard-eligible | no-translate-discard-eligible);
    (translate-fecn-and-becn | no-translate-fecn-and-becn);
    translate-plp-control-word-de;
    vlan-id number;
    vlan-id-list [number number-number];
    unnumbered-address interface-name destination address destination-profile
        profile-name;
    address address {
        arp ip-address (mac | multicast-mac) mac-address <publish>;
        broadcast address;
        destination address;
        destination-profile name;
    }

```

```

eui-64;
multipoint-destination address dlcid dlcid-identifier;
multipoint-destination address {
    epd-threshold cells;
    inverse-arp;
    oam-liveness {
        up-count cells;
        down-count cells;
    }
    oam-period (disable | seconds);
    shaping {
        (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
        burst length);
        queue-length number;
    }
    vci vpi-identifier.vci-identifier;
}
primary;
preferred;
(vrrp-group | vrrp-inet6-group) group-number {
    (accept-data | no-accept-data);
    advertise-interval seconds;
    authentication-type authentication;
    authentication-key key;
    fast-interval milliseconds;
    (preempt | no-preempt) {
        hold-time seconds;
    }
    priority-number number;
    track {
        priority-cost seconds;
        priority-hold-time interface-name {
            interface priority;
            bandwidth-threshold bits-per-second {
                priority;
            }
        }
        route ip-address/mask routing-instance instance-name priority-cost cost;
    }
    virtual-address [ addresses ];
}
}
}

```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

For information about interface-specific protocol and address properties, see *Configuring T1 and NxDSO Interfaces*.

Related Documentation

- *Configuring T1 and NxDSO Interfaces*

Configuring the Protocol Family

A protocol family is a group of logical properties within an interface configuration. Protocol families include all the protocols that make up a protocol suite. To use a protocol within a particular suite, you must configure the entire protocol family as a logical property for an interface.

Junos OS protocol families include the following common protocol suites:

- Inet—Supports IP protocol traffic, including OSPF, BGP, and Internet Control Message Protocol (ICMP).
- Inet6—Supports IPv6 protocol traffic, including RIP for IPv6 (RIPng), IS-IS, and BGP.
- ISO—Supports IS-IS traffic.
- MPLS—Supports MPLS.

In addition to the common protocol suites, JUNOS protocol families sometimes use the following protocol suites. For more information see, [family](#).

To configure the logical interface's protocol family, include the **family** statement, specifying the selected family. To configure the protocol family, following are the minimum configuration tasks under the **[edit interfaces interface-name unit logical-unit-number family family]** hierarchy.

Table 42: Protocol Family Configuration Tasks

Task	Find Details Here
Configure MTU	"Configuring the Media MTU" on page 104
Configure the unit and family so that the interface can transmit and receive multicast traffic only	Restricting Tunnels to Multicast Traffic
Disable the sending of redirect messages by the router	Configuring Junos OS to Disable Protocol Redirect Messages on the Router or Switch
Assign an address to an interface	"Configuring the Interface Address" on page 187

Related Documentation

- [family on page 546](#)

Configuring the Interface Address

You assign an address to an interface by specifying the address when configuring the protocol family. For the **inet** or **inet6** family, configure the interface IP address. For the **iso** family, configure one or more addresses for the loopback interface. For the **ccc**, **ethernet-switching**, **tcc**, **mpls**, **tnp**, and **vppls** families, you never configure an address.



NOTE: The point-to-point (PPP) address is taken from the loopback interface address that has the primary attribute. When the loopback interface is configured as an unnumbered interface, it takes the primary address from the donor interface.

To assign an address to an interface, perform the following steps:

1. Configure the interface address at the **[edit interfaces *interface-name* unit *logical-unit-number* family *family*]** hierarchy level.
 - To configure an IPv4 address on routers and switches running Junos OS, use the **interface *interface-name* unit *number* family inet address *a.b.c.d/nn*** statement at the **[edit interfaces]** hierarchy level.

```
[edit interfaces ]
```

```
user@host# set interface-name unit logical-unit-number family inet address a.b.c.d/nn
```



NOTE:

- Juniper Networks routers and switches support /31 destination prefixes when used in point-to-point Ethernet configurations; however, they are not supported by many other devices, such as hosts, hubs, routers, or switches. You must determine if the peer system also supports /31 destination prefixes before configuration.
- You can configure the same IPv4 address on multiple physical interfaces. When you assign the same IPv4 address to multiple physical interfaces, the operational behavior of those interfaces differs, depending on whether they are implicitly or explicitly point-to-point .
- By default, all interfaces are assumed to be point-to-point (PPP) interfaces. For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, you can explicitly configure an interface to be a point-to-point connection.
- If you configure the same IP address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration. The remaining IP address configurations are ignored, leaving some interfaces without an assigned address. Interfaces without an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

- To configure an IPv6 address on routers and switches running Junos OS, use the **interface *interface-name* unit *number* family inet6 address *aaaa:bbbb:::zzzz/nn*** statement at the **[edit interfaces]** hierarchy level.

```
[edit interfaces ]
```

```
user@host# set interface-name unit logical-unit-number family inet6 address  
aaaa:bbbb:::zzzz/nn
```



NOTE:

- You represent IP version 6 (IPv6) addresses in hexadecimal notation using a colon-separated list of 16-bit values. The double colon (::) represents all bits set to 0.
- You must manually configure the router or switch advertisement and advertise the default prefix for autoconfiguration to work on a specific interface.

2. [Optional] Set the broadcast address on the network or subnet .

```
[edit interfaces interface-name unit logical-unit-number family family address address],
user@host# set broadcast address
```



NOTE: The broadcast address must have a host portion of either all ones or all zeros. You cannot specify the addresses 0.0.0.0 or 255.255.255.255

3. [Optional] specify the remote address of the connection for the encrypted, PPP-encapsulated, and tunnel interfaces.

```
[edit logical-systems logical-system-name interfaces interface-name unit
  logical-unit-number family family address address]
user@host# set destination address
```

4. [Optional] For interfaces that carry IP version 6 (IPv6) traffic, configure the host to assign itself a unique 64-Bit IP Version 6 interface identifier (EUI-64).

```
[edit logical-systems logical-system-name interfaces interface-name unit
  logical-unit-number family family address address]
user@host# set eui-64
```

Related Documentation

- [Configuring Default, Primary, and Preferred Addresses and Interfaces on page 189](#)

Configuring Default, Primary, and Preferred Addresses and Interfaces

- [Default, Primary, and Preferred Addresses and Interfaces on page 189](#)
- [Configuring the Primary Interface for the Router on page 190](#)
- [Configuring the Primary Address for an Interface on page 190](#)
- [Configuring the Preferred Address for an Interface on page 191](#)

Default, Primary, and Preferred Addresses and Interfaces

The router has a default address and a primary interface, and interfaces have primary and preferred addresses.

The *default address* of the router is used as the source address on unnumbered interfaces. The routing protocol process tries to pick the default address as the router ID, which is used by protocols, including OSPF and internal BGP (IBGP).

The *primary interface* for the router is the interface that packets go out when no interface name is specified and when the destination address does not imply a particular outgoing interface.

An interface's *primary address* is used by default as the local address for broadcast and multicast packets sourced locally and sent out the interface. An interface's *preferred address* is the default local address used for packets sourced by the local router to destinations on the subnet.

The default address of the router is chosen using the following sequence:

1. The primary address on the loopback interface **lo0** that is not **127.0.0.1** is used.
2. The primary address on the primary interface is used.

Configuring the Primary Interface for the Router

The *primary interface* for the router has the following characteristics:

- It is the interface that packets go out when you type a command such as ping 255.255.255.255—that is, a command that does not include an interface name (there is no interface **type-0/0/0.0** qualifier) and where the destination address does not imply any particular outgoing interface.
- It is the interface on which multicast applications running locally on the router, such as Session Announcement Protocol (SAP), do group joins by default.
- It is the interface from which the default local address is derived for packets sourced out an unnumbered interface if there are no non-127 addresses configured on the loopback interface, **lo0**.

By default, the multicast-capable interface with the lowest-index address is chosen as the primary interface. If there is no such interface, the point-to-point interface with the lowest index address is chosen. Otherwise, any interface with an address could be picked. In practice, this means that, on the router, the **fxp0** or **em0** interface is picked by default.

To configure a different interface to be the primary interface, include the **primary** statement:

```
primary;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

Configuring the Primary Address for an Interface

The *primary address* on an interface is the address that is used by default as the local address for broadcast and multicast packets sourced locally and sent out the interface. For example, the local address in the packets sent by a ping interface **so-0/0/0.0 255.255.255.255** command is the primary address on interface **so-0/0/0.0**. The primary address flag also can be useful for selecting the local address used for packets sent out unnumbered interfaces when multiple non-127 addresses are configured on the loopback interface, **lo0**. By default, the primary address on an interface is selected as the numerically lowest local address configured on the interface.

To set a different primary address, include the **primary** statement:

```
primary;
```


You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family* address *address*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family* address *address*]

Configuring the Preferred Address for an Interface

The *preferred address* on an interface is the default local address used for packets sourced by the local router to destinations on the subnet. By default, the numerically lowest local address is chosen. For example, if the addresses 172.16.1.1/12, 172.16.1.2/12, and 172.16.1.3/12 are configured on the same interface, the preferred address on the subnet (by default, 172.16.1.1) would be used as a local address when you issue a **ping 172.16.1.5** command.

To set a different preferred address for the subnet, include the **preferred** statement:

```
preferred;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family* address *address*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family* address *address*]

Configuring ICCP for MC-LAG

For multichassis link aggregation (MC-LAG), you must configure Inter-Control Center Communications Protocol (ICCP) to exchange information between two MC-LAG peers.

To enable ICCP, include the **iccp** statement at the [edit protocols] hierarchy level:

```
[edit protocols]
iccp {
  authentication-key string;
  local-ip-addr ipv4-address;
  peer ip-address {
    authentication-key string;
    liveness-detection {
      detection-time {
        threshold milliseconds;
      }
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
      version (1 | automatic);
    }
    local-ip-addr ipv4-address;
  }
}
```

```

    redundancy-group-id-list [ redundancy-groups ];
    session-establishment-hold-time value;
}
session-establishment-hold-time value;
traceoptions;
}

```

The **local-ip-address** statement sets the source address. This could be a specified address or interface address. The **session-establishment-hold-time** statement determines whether a chassis takes over as the master at the ICCP session.

The **authentication-key** statement is provided by TCP Message Digest 5 (md5) option for an ICCP TCP session. The **redundancy-group-id-list** statement specifies the redundancy groups between ICCP peers and the **liveness-detection** hierarchy configures Bidirectional Forwarding Detection (BFD) protocol options.



NOTE: ICCP is based on TCP and it uses IP routes to reach the MC-LAG peer. To ensure that the ICCP session is as resilient as possible, we recommend that you configure alternative routes between the ICCP end-point IP addresses. Alternatively, configure a LAG interface that has two or more interfaces between the MC-LAG pairs to prevent session failure when there are no alternative routes.

For Inter-Control Center Communications Protocol (ICCP) in a multichassis link aggregation group (MC-LAG) configured in an active-active bridge domain, you must ensure that you configure the same peer IP address hosting the MC-LAG by including the **peer ip-address** statement at the **[edit protocols iccp]** hierarchy level and the **multi-chassis-protection peer ip-address** statement at the **[edit interfaces interface-name]** hierarchy level. Multichassis protection reduces the configuration at the logical interface level for MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces. If the ICCP is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer active-active node specified by the **peer** statement.

For example, the following statements illustrate how the same peer IP address can be configured for both the ICCP peer and multichassis protection link:

```

set interfaces ae1 unit 0 multi-chassis-protection 10.255.34.112 interface ae0.0
set protocols iccp peer 10.255.34.112 redundancy-group-id-list 1

```

Although you can commit an MC-LAG configuration with various parameters defined for it, you can configure multichassis protection between two peers without configuring the ICCP peer address. You can also configure multiple ICCP peers and commit such a configuration.

Related Documentation

- [\[edit protocols\] Hierarchy Level](#)

Configuring IPCP Options for Interfaces with PPP Encapsulation

For interfaces with PPP encapsulation, you can configure IPCP to negotiate IP address assignments and to pass network-related information such as Windows Name Service (WINS) and Domain Name System (DNS) servers, as defined in RFC 1877, *PPP Internet Protocol Control Protocol Extensions for Name Server Addresses*.

When you enable a PPP interface, you can configure an IP address, enable the interface to negotiate an IP address assignment from the remote end, or allow the interface to be unnumbered. You can also assign a destination profile to the remote end. The destination profile includes PPP properties, such as primary and secondary DNS and NetBIOS Name Servers (NBNSs). These options are described in the following sections:



NOTE: The Junos OS does not request name servers from the remote end; the software does, however, send name servers to the remote end if requested.

Before you begin

You must configure the PPP encapsulation on the interface before configuring the IPCP option. On the logical interface, the following PPP encapsulation types are supported:

- `atm-mlppp-llc`
- `atm-ppp-llc`
- `atm-ppp-vc-mux`
- `multilink-ppp`

For more information about PPP encapsulation, see “[Configuring Interface Encapsulation on Logical Interfaces](#)” on page 170 and *Configuring ATM Interface Encapsulation*

- To configure an IP address for the interface, include the **address** statement in the configuration. For more information, see “[Configuring the Interface Address](#)” on page 187.

If you include the **address** statement in the configuration, you cannot include the **negotiate-address** or **unnumbered-address** statement in the configuration.

When you include the **address** statement in the interface configuration, you can assign PPP properties to the remote end.



NOTE: The option to negotiate an IP address is not allowed in MLFR and MFR encapsulations.

- To enable the interface to obtain an IP address from the remote end, include the **negotiate-address** statement at the `[edit interfaces interface-name unit logical-unit-number family inet]` hierarchy level.

`[edit interfaces interface-name unit logical-unit-number family inet]`

```
user@host# set negotiate-address
```



NOTE: If you include the `negotiate-address` statement in the configuration, you cannot include the `address` or `unnumbered-address` statement in the configuration.

- To configure an interface to be unnumbered, include the `unnumbered-address` and `destination` statements in the configuration.

```
[edit interfaces interface-name unit logical-unit-number family inet]
user@host# set unnumbered-address interface-name
user@host# set destination address
```



NOTE:

- The `unnumbered-address` statement enables the local address to be derived from the specified interface. The interface name must include a logical unit number and must have a configured address (see “[Configuring the Interface Address](#)” on page 187). Specify the IP address of the remote interface with the `destination` statement.
- If you include the `unnumbered-address` statement in the configuration, you cannot include the `address` or `negotiate-address` statement in the interface configuration.

- To assign PPP properties to the remote end include the `destination-profile` statement:

```
[edit interfaces interface-name unit logical-unit-number family inet address address]
user@host# set destination-profile name
```

```
[edit interfaces interface-name unit logical-unit-number family inet unnumbered-address
interface-name]
user@host# set destination-profile name
```



NOTE:

- You can assign PPP properties to the remote end, after you include the `address` or `unnumbered-address` statement in the interface configuration.
- You define the profile at the `[edit access group-profile name ppp]` hierarchy level. For more information, see *Example: Group Profile Configuration*

**Related
Documentation**

- *Example: Group Profile Configuration*
- [Configuring Interface Encapsulation on Logical Interfaces](#) on page 170

Configuring an Unnumbered Interface

This topic includes the following information:

- [Overview of Unnumbered Interfaces on page 195](#)
- [Configuring an Unnumbered Point-to-Point Interface on page 195](#)
- [Configuring an Unnumbered Ethernet or Demux Interface on page 196](#)
- [Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces on page 197](#)
- [Restrictions for Configuring Unnumbered Ethernet Interfaces on page 198](#)
- [Displaying the Unnumbered Ethernet Interface Configuration on page 199](#)
- [Displaying the Configured Preferred Source Address for an Unnumbered Ethernet Interface on page 200](#)
- [Displaying the Configuration for Unnumbered Ethernet Interface as the Next Hop for a Static Route on page 201](#)

Overview of Unnumbered Interfaces

When you need to conserve IP addresses, you can configure unnumbered interfaces. Setting up an unnumbered interface enables IP processing on the interface without assigning an explicit IP address to the interface. For IPv6, in which conserving addresses is not a major concern, you can configure unnumbered interfaces to share the same subnet across multiple interfaces. IPv6 unnumbered interfaces are only supported on Ethernet interfaces. The statements you use to configure an unnumbered interface depend on the type of interface you are configuring: a point-to-point interface or an Ethernet interface:

Configuring an Unnumbered Point-to-Point Interface

1. In configuration mode, go to the `[edit interfaces interface-name unit logical-unit-number]` hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name unit logical-unit-number
```

2. To configure an unnumbered point-to-point interface, configure the protocol family, but do not include the **address** statement.

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set family
```



NOTE:

- For interfaces with PPP encapsulation, you can configure an unnumbered interface by including the `unnumbered-interface` statement in the configuration. For more information, see [“Configuring IPCP Options for Interfaces with PPP Encapsulation” on page 193](#).
 - When configuring unnumbered interfaces, you must ensure that a source address is configured on some interface in the router. This address is the default address. We recommend that you do this by assigning an address to the loopback interface (lo0), as described in [“Configuring the Loopback Interface” on page 287](#). If you configure an address (other than a martian) on the lo0 interface, that address is always the default address, which is preferable because the loopback interface is independent of any physical interfaces and therefore is always accessible.
-

Configuring an Unnumbered Ethernet or Demux Interface

1. In configuration mode, go to the `[edit interfaces interface-name unit logical-unit-number family family-name]` hierarchy level.

```
[edit ]
```

```
user@host# edit interfaces interface-name unit logical-unit-number family family-name
```

2. To configure an unnumbered Ethernet or demultiplexing interface, include the `unnumbered-address` statement in the configuration.

```
[edit interfaces interface-name unit logical-unit-number family family-name]
```

```
user@host# set unnumbered-address interface-name
```

3. (Optional) To specify the unnumbered Ethernet interface as the next-hop interface for a configured static route, include the `qualified-next-hop` statement at the `[edit routing-options static route destination-prefix]` hierarchy level. This feature enables you to specify independent preferences and metrics for static routes on a next-hop basis.

```
[edit routing-options static route destination-prefix]
```

```
user@host# set qualified-next-hop (address | interface-name)
```



NOTE:

- The `unnumbered-address` statement currently supports configuration of unnumbered demux interfaces only for the IPv4 address family. You can configure unnumbered Ethernet interfaces for both IPv4 and IPv6 address families.
- The interface that you configure to be unnumbered *borrow*s an assigned IP address from another interface, and is referred to as the *borrower interface*. The interface from which the IP address is borrowed is referred to as the *donor interface*. In the `unnumbered-address` statement, *interface-name* specifies the donor interface. For an unnumbered Ethernet interface, the donor interface can be an Ethernet, ATM, SONET, or loopback interface that has a logical unit number and configured IP address and is not itself an unnumbered interface. For an unnumbered IP demultiplexing interface, the donor interface can be an Ethernet or loopback interface that has a logical unit number and configured IP address and is not itself an unnumbered interface. In addition, for either Ethernet or demux, the donor interface and the borrower interface must be members of the same routing instance and the same logical system.
- When you configure an unnumbered Ethernet or demux interface, the IP address of the donor interface becomes the source address in packets generated by the unnumbered interface.
- You can configure a host route that points to an unnumbered Ethernet or demux interface. For information about host routes, see the *MPLS Applications Feature Guide for Routing Devices*.

Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces

When a loopback interface with multiple secondary IP addresses is configured as the donor interface for an unnumbered Ethernet or demux interface, you can optionally specify any one of the loopback interface's secondary addresses as the preferred source address for the unnumbered Ethernet or demux interface. This feature enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet or demux interfaces in your network.

1. In configuration mode, go to the `[edit interfaces interface-name unit logical-unit-number family family-name]` hierarchy level.

```
[edit ]
```

```
user@host# edit interfaces interface-name unit logical-unit-number family family-name
```

2. To configure a secondary address on a loopback donor interface as the preferred source address for an unnumbered Ethernet or demux interface, include the `preferred-source-address` option in the `unnumbered-address` statement:

```
[edit interfaces interface-name unit logical-unit-number family family-name]
```

```
user@host# set unnumbered-address interface-name <preferred-source-address  
address
```



NOTE:

The following considerations apply when you configure a preferred source address on an unnumbered Ethernet or demux interface:

- The **unnumbered-address** statement currently supports the configuration of a preferred source address only for the IPv4 address family for demux interfaces, and for IPv4 and IPv6 address families for Ethernet interfaces.
 - If you do not specify the preferred source address, the router uses the default primary IP address of the donor interface.
 - You cannot delete an address on a donor loopback interface while it is being used as the preferred source address for an unnumbered Ethernet or demux interface.
-

Restrictions for Configuring Unnumbered Ethernet Interfaces

The following restrictions apply when you configure unnumbered Ethernet interfaces:

- The **unnumbered-address** statement currently supports the configuration of unnumbered Ethernet interfaces for IPv4 and IPv6 address families.
- You cannot assign an IP address to an Ethernet interface that is already configured as an unnumbered interface.
- The donor interface for an unnumbered Ethernet interface must have one or more configured IP addresses.
- The donor interface for an unnumbered Ethernet interfaced cannot be configured as unnumbered.
- An unnumbered Ethernet interface does not support configuration of the following **address** statement options: **arp**, **broadcast**, **primary**, **preferred**, and **vrp-group**. For information about these options, see [“Configuring the Interface Address” on page 187](#).
- Running IGMP and PIM are supported only on unnumbered Ethernet interfaces that directly face the host and have no downstream PIM neighbors. IGMP and PIM are not supported on unnumbered Ethernet interfaces that act as upstream interfaces in a PIM topology.
- Running OSPF and IS-IS on unnumbered Ethernet interfaces is not supported. However, you can run OSPF over unnumbered Ethernet interfaces configured as a Point-to-Point connection.



NOTE: If you configure the same address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration, the remaining address configurations are ignored and can leave interfaces without an address. Interfaces that do not have an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

For example, in the following configuration the address configuration of interface xe-0/0/1.0 is ignored:

```
interfaces {
  xe-0/0/0 {
    unit 0 {
      family inet {
        address 192.168.1.1/24;
      }
    }
  }
  xe-0/0/1 {
    unit 0 {
      family inet {
        address 192.168.1.1/24;
      }
    }
  }
}
```

For more information on configuring the same address on multiple interfaces, see [“Configuring the Interface Address” on page 187](#).

Displaying the Unnumbered Ethernet Interface Configuration

Purpose To display the configured unnumbered interface at the `[edit interfaces interface-name unit logical-unit-number]` hierarchy level:

- Unnumbered interface —ge-1/0/0
- Donor interface —ge-0/0/0
- Donor interface address —4.4.4.1/24

The unnumbered interface “borrows” an IP address from the donor interface.

Action • Run the **show** command at the `[edit]` hierarchy level.

```
interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 4.4.4.1/24;
      }
    }
  }
  ge-1/0/0 {
    unit 0 {
      family inet {
        unnumbered-address ge-0/0/0.0;
      }
    }
  }
}
```

```
    }  
  }  
}
```

Meaning The sample configuration that is described works correctly on M and T Series routers. For unnumbered interfaces on MX Series routers, you must additionally configure static routes on an unnumbered Ethernet interface by including the **qualified-next-hop** statement at the **[edit routing-options static route destination-prefix]** hierarchy level to specify the unnumbered Ethernet interface as the next-hop interface for a configured static route.

Displaying the Configured Preferred Source Address for an Unnumbered Ethernet Interface

Purpose To display the configuration of preferred source address for an unnumbered interface at the **[edit interfaces *interface-name* unit *logical-unit-number* family inet]** hierarchy level:

- Unnumbered interface —ge-4/0/0
- Donor interface —lo0
- Donor interface primary address—2.2.2.1/32
- Donor interface secondary address—3.3.3.1/32

Action • Run the **show** command at the **[edit]** hierarchy level.

```
interfaces {  
  lo0 {  
    unit 0 {  
      family inet {  
        address 2.2.2.1/32;  
        address 3.3.3.1/32;  
      }  
    }  
  }  
}  
interfaces {  
  ge-4/0/0 {  
    unit 0 {  
      family inet {  
        unnumbered-address lo0.0 preferred-source-address 3.3.3.1;  
      }  
    }  
  }  
}
```

Meaning The loopback interface **lo0** is the donor interface from which unnumbered Ethernet interface **ge-4/0/0** “borrows” an IP address.

The example shows one of the loopback interface’s secondary addresses, 3.3.3.1, as the preferred source address for the unnumbered Ethernet interface.

Displaying the Configuration for Unnumbered Ethernet Interface as the Next Hop for a Static Route

Purpose To display the unnumbered interface configured as the next hop for the static route at the `[edit interfaces interface-name unit logical-unit-number family inet]` hierarchy level:

- Unnumbered interface —`ge-0/0/0`
- Donor interface —`lo0`
- Donor interface primary address—`5.5.5.1/32`
- Donor interface secondary address—`6.6.6.1/32`
- Static route—`7.7.7.1/32`

Action • Run the `show` command at the `[edit]` hierarchy level.

```
interfaces {
  lo0 {
    unit 0 {
      family inet {
        address 5.5.5.1/32;
        address 6.6.6.1/32;
      }
    }
  }
}
```

Meaning In this example, `ge-0/0/0` is the unnumbered interface and a loopback interface, `lo0`, is the donor interface from which `ge-0/0/0` “borrows” an IP address. The example also configures a static route to `7.7.7.1/32` with a next hop through unnumbered interface `ge-0/0/0.0`.

Setting the Protocol MTU

When you initially configure an interface, the protocol maximum transmission unit (MTU) is calculated automatically. If you subsequently change the media MTU, the protocol MTU on existing address families automatically changes.

For a list of default protocol MTU values, see [“Media MTU Sizes by Interface Type” on page 94](#).

To modify the MTU for a particular protocol family, include the `mtu` statement:

```
mtu bytes;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family family]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]`

If you increase the size of the protocol MTU, you must ensure that the size of the media MTU is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. For a list of encapsulation overhead values, see [“Encapsulation Overhead by Interface Encapsulation Type” on page 101](#). If you reduce the media MTU size, but there are already one or more address families configured and active on the interface, you must also reduce the protocol MTU size. (You configure the media MTU by including the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level.)



NOTE: Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

The maximum number of data-link connection identifiers (DLCIs) is determined by the MTU on the interface. If you have keepalives enabled, the maximum number of DLCIs is 1000, with the MTU set to 5012.

The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the MTU. For example, the default protocol MTU for a Gigabit Ethernet interface is 1500 bytes, but the largest possible frame size is actually 1504 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

**Related
Documentation**

- [Media MTU Overview on page 93](#)
- [Configuring the Media MTU on page 104](#)

Disabling the Removal of Address and Control Bytes

For Point-to-Point Protocol (PPP) CCC-encapsulated interfaces, the address and control bytes are removed by default before the packet is encapsulated into a tunnel.

You can disable the removal of address and control bytes. To do this, include the **keep-address-and-control** statement:

`keep-address-and-control;`

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family ccc]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family ccc]`

**Related
Documentation**

- [keep-address-and-control on page 624](#)

Disabling the Transmission of Redirect Messages on an Interface

By default, the interface sends protocol redirect messages. To disable the sending of these messages on an interface, include the **no-redirects** statement:

`no-redirects;`

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family family]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]`

To disable the sending of protocol redirect messages for the entire router or switch, include the **no-redirects** statement at the `[edit system]` hierarchy level.

Related
Documentation

- [no-redirects on page 723](#)

Applying Policers

- [Overview of Applying Policers on page 203](#)
- [Applying Aggregate Policers on page 204](#)
- [Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs on page 206](#)
- [Configuring Hierarchical Policers on page 208](#)
- [Configuring a Single-Rate Two-Color Policer on page 209](#)
- [Configuring a Single-Rate Color-Blind Policer on page 210](#)
- [Configuring a Two-Rate Tricolor Marker Policer on page 210](#)

Overview of Applying Policers

Policies allow you to perform simple traffic policing on specific interfaces or Layer 2 virtual private networks (VPNs) without configuring a firewall filter. To apply policies, include the **policer** statement:

```
policer {
  arp policer-template-name;
  input policer-template-name;
  output policer-template-name;
}
```

You can include these statements at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family family]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]`

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls**.

In the **arp** statement, list the name of one policer template to be evaluated when Address Resolution Protocol (ARP) packets are received on the interface. By default, an ARP policer is installed that is shared among all the Ethernet interfaces on which you have configured the **family inet** statement. If you want more stringent or lenient policing of ARP packets, you can configure an interface-specific policer and apply it to the interface. You configure an ARP policer just as you would configure any other policer, at the `[edit firewall policer]` hierarchy level. If you apply this policer to an interface, the default ARP

packet policer is overridden. If you delete this policer, the default policer takes effect again.

In the **input** statement, list the name of one policer template to be evaluated when packets are received on the interface.

In the **output** statement, list the name of one policer template to be evaluated when packets are transmitted on the interface.



NOTE: To use policing on a CCC or TCC interface, you must configure the CCC or TCC protocol family.

You can configure a different policer on each protocol family on an interface, with one input policer and one output policer for each family. When you apply policers, you can configure the family **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls** only, and one ARP policer for the family **inet** protocol only. Each time a policer is referenced, a separate copy of the policer is installed on the packet forwarding components for that interface.

If you apply both policers and firewall filters to an interface, input policers are evaluated before input firewall filters, and output policers are evaluated after output firewall filters.

If you apply the policer to the interface **lo0**, it is applied to packets received or transmitted by the Routing Engine.

On T Series, M120, and M320 platforms, if the interfaces are on the same FPC, the filters or policers do not act on the sum of traffic entering and exiting the interfaces.

For more information about policers, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

Applying Aggregate Policers

- [Applying Aggregate Policers on page 204](#)

Applying Aggregate Policers

By default, if you apply a policer to multiple protocol families on the same logical interface, the policer restricts traffic for each protocol family individually. For example, a policer with a 50 Mbps bandwidth limit applied to both IPv4 and IPv6 traffic would allow the interface to accept 50 Mbps of IPv4 traffic and 50 Mbps of IPv6 traffic. If you apply an aggregate policer, the policer would allow the interface to receive only 50 Mbps of IPv4 and IPv6 traffic combined.

To configure an aggregate policer, include the **logical-interface-policer** statement at the **[edit firewall policer policer-template-name]** hierarchy level:

```
[edit firewall policer policer-template-name]
  logical-interface-policer;
```

For the policer to be treated as an aggregate, you must apply it to multiple protocol families on a single logical interface by including the **policer** statement:

```

policer {
    arp policer-template-name;
    input policer-template-name;
    output policer-template-name;
}

```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls**.

The protocol families on which you do not apply the policer are not affected by the policer. For example, if you configure a single logical interface to accept MPLS, IPv4, and IPv6 traffic and you apply the logical interface policer **policer1** to only the IPv4 and IPv6 protocol families, MPLS traffic is not subject to the constraints of **policer1**.

If you apply **policer1** to a different logical interface, there are two instances of the policer. This means the Junos OS polices traffic on separate logical interfaces separately, not as an aggregate, even if the same logical-interface policer is applied to multiple logical interfaces on the same physical interface port.

Example: Applying Aggregate Policers

Configure two logical interface policers: **aggregate_police1** and **aggregate_police2**. Apply **aggregate_police1** to IPv4 and IPv6 traffic received on logical interface **fe-0/0/0.0**. Apply **aggregate_police2** to CCC and MPLS traffic received on logical interface **fe-0/0/0.0**. This configuration causes the software to create only one instance of **aggregate_police1** and one instance of **aggregate_police2**.

Apply **aggregate_police1** to IPv4 and IPv6 traffic received on another logical interface **fe-0/0/0.1**. This configuration causes the software to create a new instance of **aggregate_police1**, one that applies to unit 0 and another that applies to unit 1.

```

[edit firewall]
policer aggregate_police1 {
    logical-interface-policer;
    if-exceeding {
        bandwidth-limit 100m;
        burst-size-limit 500k;
    }
    then {
        discard;
    }
}
policer aggregate_police2 {
    logical-interface-policer;
    if-exceeding {
        bandwidth-limit 10m;
        burst-size-limit 200k;
    }
    then {

```

```
        discard;
    }
}
[edit interfaces fe-0/0/0]
unit 0 {
    family inet {
        policer {
            input aggregate_police1;
        }
    }
    family inet6 {
        policer {
            input aggregate_police1;
        }
    }
    family ccc {
        policer {
            input aggregate_police2;
        }
    }
    family mpls {
        policer {
            input aggregate_police2;
        }
    }
}
unit 1 {
    family inet {
        policer {
            input aggregate_police1;
        }
    }
    family inet6 {
        policer {
            input aggregate_police1;
        }
    }
}
```

Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs

- [Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs on page 206](#)

Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs

M40e, M120, and M320 edge routers and T Series core routers with Enhanced Intelligent Queuing (IQE) PICs support hierarchical policers in the ingress direction and allow you to apply a hierarchical policer for the premium and aggregate (premium plus normal) traffic levels to an interface. Hierarchical policers provide cross-functionality between the configured physical interface and the Packet Forwarding Engine.

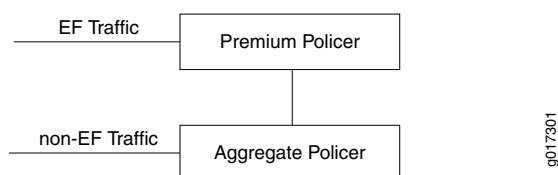
Before you begin, there are some general restrictions that apply to hierarchical policers:

- Only one type of policer can be configured for a logical or physical interface. For example, a hierarchical policer and a regular policer in the same direction for the same logical interface is not allowed.
- The chaining of the policers—that is, applying policers to both a port and the logical interfaces of that port—is not allowed.
- There is a limit of 64 policers per interface in case there is no BA classification, providing a single policer per DLCI.
- Only one kind of policer can be applied on a physical or logical interface.
- The policer should be independent of BA classification. Without BA classification, all traffic on an interface will be treated either as EF or non-EF, based on the configuration. With BA classification, an interface can support up to 64 policers. Again, the interface here may be a physical interface or logical interface (for example, DLCI).
- With BA classification, the miscellaneous traffic (the traffic *not* matching with any of the BA classification DSCP/EXP bits) will be policed as non-EF traffic. No separate policers will be installed for this traffic.

Hierarchical Policer Overview

Hierarchical policing uses two token buckets, one for aggregate (non-EF) traffic and one for premium (EF) traffic. Which traffic is EF and which is non-EF is determined by the class-of-service configuration. Logically, hierarchical policing is achieved by chaining two policers.

Figure 11: Hierarchical Policer



In the example in [Figure 11 on page 207](#), EF traffic is policed by Premium Policer and non EF traffic is policed by Aggregate Policer. What that means is, for EF traffic the out-of-spec action will be the one that is configured for Premium Policer, but the in-spec EF traffic will still consume the tokens from the Aggregate Policer.

But EF traffic will never be submitted to the out-of-spec action of the Aggregate Policer. Also, if the out-of-spec action of the Premium Policer is not set to Discard, those out-of-spec packets will not consume the tokens from the Aggregate Policer. Aggregate Policer only polices the non-EF traffic. As you can see, the Aggregate Policer token bucket can go negative, if all the tokens are consumed by the non-EF traffic and then you get bursts of EF traffic. But that will be for a very short time, and over a period of time it will average out. For example:

- *Premium Policer*: Bandwidth 2 Mbps, OOS Action: Discard
- *Aggregate Policer*: Bandwidth 10 Mbps, OOS Action: Discard

In the above case, EF traffic is guaranteed 2 Mbps and the non-EF traffic will get from 8 Mbps to 10 Mbps, depending on the input rate of the EF traffic.

Hierarchical Policing Characteristics

Hierarchical token bucket features include:

- Ingress traffic is first classified into EF and non-EF traffic prior to applying a policer:
 - Classification is performed by Q-tree lookup
- Channel number selects a shared token bucket policer:
 - Dual token bucket policer is divided into two single bucket policers:
 - Policer1—EF traffic
 - Policer2—non-EF traffic
- Shared token bucket is used to police the traffic as follows:
 - Policer1 is set to EF rate (for example, 2 Mbps)
 - Policer2 is set to aggregate interface policed rate (for example, 10 Mbps).
 - EF traffic gets applied to Policer1.
 - If traffic is in-spec it is allowed to pass and decrement from both Policer1 and Policer2.
 - If traffic is out-of-spec it can be discarded or marked with a new FC or loss priority. Policer2 will not do anything with out-of-spec EF traffic.
 - Non-EF traffic gets applied only to Policer2.
 - If traffic is in-spec it is allowed to pass through and decremented Policer2.
 - If traffic is out-of-spec it is discarded or marked with a new FC or set with a new drop priority.
- Rate-limit the port speed to a desired rate at Layer 2
- Rate-limit the EF traffic
- Rate-limit the non-EF traffic
- Policing drops counted per color

Configuring Hierarchical Policers

To configure a hierarchical policer, apply the **policing-priority** statement to the proper forwarding class and configure a hierarchical policer for the aggregate and premium level. For more information about class of service, see the *Class of Service Feature Guide for Routing Devices*.



NOTE: Hierarchical policers can only be configured on SONET physical interfaces hosted on an IQE PIC. Only aggregate and premium levels are supported.

CoS Configuration of Forwarding Classes for Hierarchical Policers

```
[edit class-of-service forwarding-classes]
class fc1 queue-num 0 priority high policing-priority premium;
class fc2 queue-num 1 priority low policing-priority normal;
class fc3 queue-num 2 priority low policing-priority normal;
class fc4 queue-num 3 priority low policing-priority normal;
```

For detailed information on class-of-service configuration and statements, see the *Class of Service Feature Guide for Routing Devices*.

Firewall Configuration for Hierarchical Policers

```
[edit firewall hierarchical-policer foo]
aggregate {
  if-exceeding {
    bandwidth-limit 70m;
    burst-size-limit 1500;
  }
  then {
    discard;
  }
}
premium {
  if-exceeding {
    bandwidth-limit 50m;
    burst-size-limit 1500;
  }
  then {
    discard;
  }
}
```

You can apply the hierarchical policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-hierarchical-policer foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-hierarchical-policer foo;
```

Configuring a Single-Rate Two-Color Policer

You can configure a single-rate two-color policer as follows:

```
[edit firewall policer foo]
if-exceeding {
  bandwidth-limit 50m;
  burst-size-limit 1500;
}
then {
  discard;
}
```

You can apply the policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-policer foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-policer foo;
```

Configuring a Single-Rate Color-Blind Policer

This section describes single-rate color blind and color aware policers.

You can configure a single-rate color blind policer as follows:

```
[edit firewall three-color-policer foo]
single-rate {
  color-blind;
  committed-information-rate 50m;
  committed-burst-size 1500;
  excess-burst-size 1500;
}
```

You can apply the single-rate color blind policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color foo;
```

You can configure a single-rate color-aware policer as follows:

```
[edit firewall three-color-policer bar]
single-rate {
  color-aware;
  committed-information-rate 50m;
  committed-burst-size 1500;
  excess-burst-size 1500;
}
```

You can apply the single-rate color-aware policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color bar;
```

Configuring a Two-Rate Tricolor Marker Policer

Ingress policing is implemented using a two-rate tricolor marker (trTCM). This is done with a dual token bucket (DTB) that maintains two rates, committed, and a peak. Egress static policing also uses a token bucket.

The token buckets perform the following ingress policing functions:

- (1K) trTCM - Dual token bucket (red, yellow, and green marking)
- Policing is based on Layer 2 packet size:
 - After +/- byte adjust offset
- Marking is color aware and color blind:
 - Color aware needs to have the color set by q-tree lookup based on:
 - ToS
 - EXP
- Programmable marking actions:
 - Color (red, yellow, green)
 - Drop based on color and congestion profile
- Policer is selected based on the arriving channel number:
 - Channel number LUT produces policer index and queue index
 - Multiple channels can share the same policer (LUT produces same policer index)
- Support ingress policing and trTCM at the following levels:
 - Queue
 - Logical interface (ifl/DLCI)
 - Physical interface (ifd)
 - Physical port (controller ifd)
 - Any combinations of logical interface, physical interface, and port
- Support percentage of interface speed and bits per second

Rate limits may be applied to selected queues on ingress and on predefined queues at egress. The token bucket operates in color aware and color blind modes (specified by RFC 2698).

Configuring a Color-Blind trTCM

```
[edit firewall three-color-policer foo]
two-rate {
  color-blind;
  committed-information-rate 50m;
  committed-burst-size 1500;
  peak-information-rate 100m;
  peak-burst-size 3k;
}
```

You can apply the three-color two-rate color-blind policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color foo;
```

You also have the option to apply the policer at the physical port level as follows:

**Configuring a
Color-Aware trTCM**

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color foo;

[edit firewall three-color-policer bar]
two-rate {
  color-aware;
  committed-information-rate 50m;
  committed-burst-size 1500;
  peak-information-rate 100m;
  peak-burst-size 3k;
}
```

You can apply the three-color two-rate color-aware policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color bar;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color bar;
```

Applying a Filter to an Interface

- [Defining Interface Groups in Firewall Filters on page 212](#)
- [Applying a Filter to an Interface on page 213](#)

Defining Interface Groups in Firewall Filters

When applying a firewall filter, you can define an interface to be part of an *interface group*. Packets received on that interface are tagged as being part of the group. You can then match these packets using the **interface-group** match statement, as described in the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

To define the interface to be part of an interface group, include the **group** statement:

```
group filter-group-number;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* family *family* filter]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family* filter]**



NOTE: The number 0 is not a valid interface group number.

Filter-Based Forwarding on the Output Interface

If port-mirrored packets are to be distributed to multiple monitoring or collection interfaces, based on patterns in packet headers, it is helpful to configure a filter-based forwarding (FBF) filter on the port-mirroring egress interface.

When an FBF filter is installed as an output filter, a packet that is forwarded to the filter has already undergone at least one route lookup. After the packet is classified at the egress interface by the FBF filter, it is redirected to another routing table for additional route lookup. To avoid packet looping inside the Packet Forwarding Engine, the route lookup in the latter routing table (designated by an FBF routing instance) must result in a different next hop from any next hop specified in a table that has already been applied to the packet.

If an input interface is configured for FBF, the source lookup is disabled for those packets headings to a different routing instance, since the routing table is not set up to handle the source lookup.

For more information about FBF configuration, see the *Junos OS Routing Protocols Library for Routing Devices*. For more information about port mirroring, see the *Junos OS Services Interfaces Library for Routing Devices*.

Applying a Filter to an Interface

To apply firewall filters to an interface, include the **filter** statement:

```
filter {
  group filter-group-number;
  input filter-name;
  input-list [ filter-names ];
  output filter-name;
  output-list [ filter-names ];
}
```

To apply a single filter, include the **input** statement:

```
filter {
  input filter-name;
}
```

To apply a list of filters to evaluate packets received on an interface, include the **input-list** statement.

```
filter {
  input-list [ filter-names ];
}
```

Up to 16 filter names can be included in an input list.

To apply a list of filters to evaluate packets transmitted on an interface, include the **output-list** statement.

```
filter {
  output-list [ filter-names ];
}
```

When you apply filters using the **input-list** statement or the **output-list** statement, a new filter is created with the name `<interface-name>.<unit-direction>`. This filter is exclusively interface-specific.

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, or **vpls**.

In the **group** statement, specify the interface group number to associate with the filter.

In the **input** statement, list the name of one firewall filter to be evaluated when packets are received on the interface.

In the **input-list** statement, list the names of filters to evaluate when packets are received on the interface. You can include up to 16 filter names.

In the **output** statement, list the name of one firewall filter to be evaluated when packets are transmitted on the interface.



NOTE: Output filters do not work for broadcast and multicast traffic, including VPLS traffic (except in MX Series routers with MPC/MIC interfaces), as shown in “[Applying a Filter to an Interface](#)” on page 213.



NOTE: On an MX Series router, you cannot apply as an output filter, a firewall filter configured at the [edit firewall filter family ccc] hierarchy level. Firewall filters configured for the family ccc statement can be applied only as input filters.

In the **output-list** statement, list the names of filters to evaluate when packets are transmitted on the interface. You can include up to 16 filter names.

You can use the same filter one or more times. On M Series routers (except the M320 and M120 routers), if you apply a firewall filter or policer to multiple interfaces, the filter or policer acts on the sum of traffic entering or exiting those interfaces.

On T Series, M120, and M320 routers, interfaces are distributed among multiple packet forwarding components. Therefore, on these routers, if you apply a firewall filter or policer to multiple interfaces, the filter or policer acts on the traffic stream entering or exiting each interface, regardless of the sum of traffic on the multiple interfaces.

For more information on Understanding Ethernet Frame Statistics, see the *MX Series Layer 2 Configuration Guide*.

If you apply the filter to the interface **lo0**, it is applied to packets received or transmitted by the Routing Engine. You cannot apply MPLS filters to the management interface (**fxp0** or **em0**) or the loopback interface (**lo0**).

Filters applied at the **[set interfaces lo0 unit 0 family any filter input]** hierarchy level are not installed on T4000 Type 5 FPCs.

For more information about firewall filters, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*. For more information about MPLS filters, see the *MPLS Applications Feature Guide for Routing Devices*.

Example: Input Filter for VPLS Traffic

For M Series and T Series routers only, apply an input filter to VPLS traffic. Output filters do not work for broadcast and multicast traffic, including VPLS traffic. Note that on MX Series routers with MPC/MIC interfaces, the VPLS filters on the egress is applicable to broadcast, multicast, and unknown unicast traffic.

```
[edit interfaces]
fe-2/2/3 {
  vlan-tagging;
  encapsulation vlan-vpls;
  unit 601 {
    encapsulation vlan-vpls;
    vlan-id 601;
    family vpls {
      filter {
        input filter1; # Works for multicast destination MAC address
        output filter1; # Does not work for multicast destination MAC address
      }
    }
  }
}
[edit firewall]
family vpls {
  filter filter1 {
    term 1 {
      from {
        destination-mac-address {
          01:00:0c:cc:cc:cd/48;
        }
      }
      then {
        discard;
      }
    }
    term 2 {
      then {
        accept;
      }
    }
  }
}
```

Example: Filter-Based Forwarding at the Output Interface

The following example illustrates the configuration of filter-based forwarding at the output interface. In this example, the packet flow follows this path:

1. A packet arrives at interface **fe-1/2/0.0** with source and destination addresses **10.50.200.1** and **10.50.100.1** respectively.
2. The route lookup in routing table **inet.0** points to the egress interface **so-0/0/3.0**.
3. The output filter installed at **so-0/0/3.0** redirects the packet to routing table **fbf.inet.0**.
4. The packet matches the entry **10.50.100.0/25** in the **fbf.inet.0** table, and finally leaves the router from interface **so-2/0/0.0**.

```
[edit interfaces]
so-0/0/3 {
  unit 0 {
    family inet {
      filter {
        output fbf;
      }
      address 10.50.10.2/25;
    }
  }
}
fe-1/2/0 {
  unit 0 {
    family inet {
      address 10.50.50.2/25;
    }
  }
}
so-2/0/0 {
  unit 0 {
    family inet {
      address 10.50.20.2/25;
    }
  }
}
[edit firewall]
filter fbf {
  term 0 {
    from {
      source-address {
        10.50.200.0/25;
      }
    }
    then routing-instance fbf;
  }
  term d {
    then count d;
  }
}
[edit routing-instances]
fbf {
  instance-type forwarding;
  routing-options {
```

```

static {
    route 10.50.100.0/25 next-hop so-2/0/0.0;
}
}
[edit routing-options]
interface-routes {
    rib-group inet fbf-group;
}
static {
    route 10.50.100.0/25 next-hop 10.50.10.1;
}
rib-groups {
    fbf-group {
        import-rib [inet.0 fbf.inet.0];
    }
}

```

Configuring Unicast RPF

- [Configuring Unicast RPF on page 217](#)
- [Unicast RPF and Default Route on page 218](#)
- [Configuring Unicast RPF Strict Mode on page 220](#)
- [Configuring Unicast RPF Loose Mode on page 221](#)
- [Configuring Unicast RPF Loose Mode with Ability to Discard Packets on page 223](#)
- [Configuring Unicast RPF on a VPN on page 224](#)
- [Configuring Unicast RPF on page 225](#)

Configuring Unicast RPF

For interfaces that carry IPv4 or IPv6 traffic, you can reduce the impact of denial of service (DoS) attacks by configuring unicast reverse path forwarding (RPF). Unicast RPF helps determine the source of attacks and rejects packets from unexpected source addresses on interfaces where unicast RPF is enabled.



NOTE: If you want to configure unicast RPF, your router must be equipped with the Internet Processor II application-specific integrated circuit (ASIC).

If you enable unicast RPF on live traffic, some packets are dropped while the packet forwarding components are updating.

For transit packets exiting the router through the tunnel, forwarding path features, such as RPF, forwarding table filtering, source class usage, and destination class usage are not supported on the interfaces you configure as the output interface for tunnel traffic. For firewall filtering, you must allow the output tunnel packets through the firewall filter applied to input traffic on the interface that is the next-hop interface towards the tunnel destination.

The following sections describe unicast RPF in detail:

Unicast RPF and Default Route

When the active route cannot be chosen from the routes in a routing table, the router chooses a default route. A default route is equivalent to an IP address of 0.0.0.0/0. If you configure a default route, and you configure unicast RPF on an interface that the default route uses, unicast RPF behaves differently than it does otherwise. For information about configuring default routes, see the *Junos OS Routing Protocols Library for Routing Devices*.

To determine whether the default route uses an interface, enter the **show route** command:

```
user@host> show route address
```

address is the next-hop address of the configured default route. The default route uses the interfaces shown in the output of the **show route** command.

The following sections describe how unicast RPF behaves when a default route uses an interface and when a default route does not use an interface:

- [Unicast RPF Behavior with a Default Route on page 218](#)
- [Unicast RPF Behavior Without a Default Route on page 219](#)
- [Unicast RPF with Routing Asymmetry on page 219](#)

Unicast RPF Behavior with a Default Route

On all routers except those with MPCs and the MX80 router, unicast RPF behaves as follows if you configure a default route that uses an interface configured with unicast RPF:

- Loose mode—All packets are automatically accepted. For this reason, we recommend that you not configure unicast RPF loose mode on interfaces that the default route uses.
- Strict mode—The packet is accepted when the source address of the packet matches any of the routes (either default or learned) that can be originated from the interface. Note that routes can have multiple destinations associated with them; therefore, if one of the destinations matches the incoming interface of the packet, the packet is accepted.

On all routers with MPCs and the MX80 router, unicast RPF behaves as follows if you configure a default route that uses an interface configured with unicast RPF:

- Loose mode—All packets except the packets whose source is learned from the default route are accepted. All packets whose source is learned from the default route are dropped at the Packet Forwarding Engine. The default route is treated as if the route does not exist.
- Strict mode—The packet is accepted when the source address of the packet matches any of the routes (either default or learned) that can be originated from the interface. Note that routes can have multiple destinations associated with them; therefore, if

one of the destinations matches the incoming interface of the packet, the packet is accepted.

On all routers, the packet is not accepted when either of the following is true:

- The source address of the packet does not match a prefix in the routing table.
- The interface does not expect to receive a packet with this source address prefix.

Unicast RPF Behavior Without a Default Route

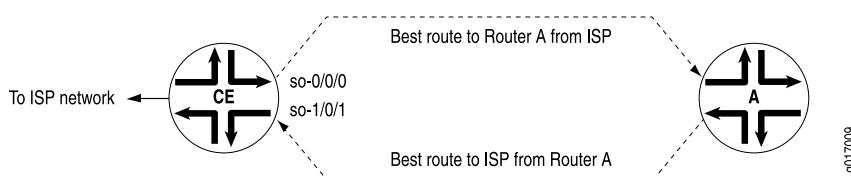
If you do not configure a default route, or if the default route does not use an interface configured with unicast RPF, unicast RPF behaves as described in [“Configuring Unicast RPF Strict Mode” on page 220](#) and [“Configuring Unicast RPF Loose Mode” on page 221](#). To summarize, unicast RPF without a default route behaves as follows:

- Strict mode—The packet is not accepted when either of the following is true:
 - The packet has a source address that does not match a prefix in the routing table.
 - The interface does not expect to receive a packet with this source address prefix.
- Loose mode—The packet is not accepted when the packet has a source address that does not match a prefix in the routing table.

Unicast RPF with Routing Asymmetry

In general, we recommend that you not enable unicast RPF on interfaces that are internal to the network because internal interfaces are likely to have *routing asymmetry*. Routing asymmetry means that a packet’s outgoing and return paths are different. Routers in the core of the network are more likely to have asymmetric reverse paths than routers at the customer or provider edge. [Figure 12 on page 219](#) shows unicast RPF in an environment with routing asymmetry.

Figure 12: Unicast RPF with Routing Asymmetry



In [Figure 12 on page 219](#), if you enable unicast RPF on interface **so-0/0/0**, traffic destined for Router A is not rejected. If you enable unicast RPF on interface **so-1/0/1**, traffic from Router A is rejected.

If you need to enable unicast RPF in an asymmetric routing environment, you can use fail filters to allow the router to accept incoming packets that are known to be arriving by specific paths. For an example of a fail filter that accepts packets with a specific source and destination address, see [“Configuring Unicast RPF” on page 225](#).

Configuring Unicast RPF Strict Mode

In strict mode, unicast RPF checks whether the incoming packet has a source address that matches a prefix in the routing table, and whether the interface expects to receive a packet with this source address prefix.

If the incoming packet fails the unicast RPF check, the packet is not accepted on the interface. When a packet is not accepted on an interface, unicast RPF counts the packet and sends it to an optional fail filter. If the fail filter is not configured, the default action is to silently discard the packet.

The optional fail filter allows you to apply a filter to packets that fail the unicast RPF check. You can define the fail filter to perform any filter operation, including accepting, rejecting, logging, sampling, or policing.

When unicast RPF is enabled on an interface, Bootstrap Protocol (BOOTP) packets and Dynamic Host Configuration Protocol (DHCP) packets are not accepted on the interface. To allow the interface to accept BOOTP packets and DHCP packets, you must apply a fail filter that accepts all packets with a source address of **0.0.0.0** and a destination address of **255.255.255.255**. For a configuration example, see [“Configuring Unicast RPF” on page 225](#).

For more information about unicast RPF, see the *Junos OS Routing Protocols Library for Routing Devices*. For more information about defining fail filters, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices*.

To configure unicast RPF, include the **rpf-check** statement:

```
rpf-check <fail-filter filter-name>;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6)]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6)]**

Using unicast RPF can have several consequences when implemented with traffic filters:

- RPF fail filters are evaluated after input filters and before output filters.
- If you configure a filter counter for packets dropped by an input filter, and you want to know the total number of packets dropped, you must also configure a filter counter for packets dropped by the RPF check.
- To count packets that fail the RPF check and are accepted by the RPF fail filter, you must configure a filter counter.
- If an input filter forwards packets anywhere other than the inet.0 or inet6.0 routing tables, the unicast RPF check is not performed.
- If an input filter forwards packets anywhere other than the routing instance the input interface is configured for, the unicast RPF check is not performed.

Configure unicast RPF strict mode, and apply a fail filter that allows the interface to accept BOOTP packets and DHCP packets. The filter accepts all packets with a source address of **0.0.0.0** and a destination address of **255.255.255.255**.

To configure unicast RPF in strict mode:

1. Configure the fail filter:

```
[edit firewall]
filter rpf-special-case-dhcp-bootp {
  term allow-dhcp-bootp {
    from {
      source-address {
        0.0.0.0/32;
      }
      address {
        255.255.255.255/32;
      }
    }
    then {
      count rpf-dhcp-bootp-traffic;
      accept;
    }
  }
  term default {
    then {
      log;
      reject;
    }
  }
}
```

2. Configure unicast RPF on interfaces:

```
[edit]
interfaces {
  so-0/0/0 {
    unit 0 {
      family inet {
        rpf-check fail-filter rpf-special-case-dhcp-bootp;
      }
    }
  }
}
```

3. Commit the configuration.

```
[edit]
commit;
```

Configuring Unicast RPF Loose Mode

By default, unicast RPF uses strict mode. Unicast RPF loose mode is similar to unicast RPF strict mode and has the same configuration restrictions. The only check in loose mode is whether the packet has a source address with a corresponding prefix in the routing table; loose mode does not check whether the interface expects to receive a

packet with a specific source address prefix. If a corresponding prefix is not found, unicast RPF loose mode does not accept the packet. As in strict mode, loose mode counts the failed packet and optionally forwards it to a fail filter, which either accepts, rejects, logs, samples, or polices the packet.

To configure unicast RPF loose mode, include the **mode**:

1. **mode** loose;

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6) rpf-check <fail-filter *filter-name*>]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6) rpf-check <fail-filter *filter-name*>]

2. For example:

In this example, no special configuration beyond device initialization is required.

Configure unicast RPF loose mode, and apply a fail filter that allows the interface to accept BOOTP packets and DHCP packets. The filter accepts all packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255.

To configure unicast RPF in loose mode:

- a. Configure the fail filter:

```
[edit firewall]
filter rpf-special-case-dhcp-bootp {
  term allow-dhcp-bootp {
    from {
      source-address {
        0.0.0.0/32;
      }
      address {
        255.255.255.255/32;
      }
    }
    then {
      count rpf-dhcp-bootp-traffic;
      accept;
    }
  }
  term default {
    then {
      log;
      reject;
    }
  }
}
```

- b. Configure unicast RPF on interfaces:

```
[edit]
interfaces {
  so-0/0/0 {
```



```

    unit 0 {
      family inet {
        rpf-check fail-filter rpf-special-case-dhcp-bootp;
        mode loose;
      }
    }
  }
}

```

- c. Commit the configuration.

```

[edit]
commit;

```

Configuring Unicast RPF Loose Mode with Ability to Discard Packets

Starting with Junos OS Release 12.1, unicast RPF loose mode has the ability to discard packets with the source address pointing to the discard interface. This feature is supported on MX Series routers and on T Series routers with Type 1 FPCs, Type 2 FPCs, and Type 3 FPCs. Using unicast RPF loose mode, along with Remote Triggered Black Hole (RTBH) filtering, provides an efficient way to discard packets coming from known attack sources. BGP policies in edge routers ensure that packets with untrusted source addresses have their next hop set to a discard route. When a packet arrives at the router with an untrusted source address, unicast RPF performs a route lookup of the source address. Because the source address route points to a discard next hop, the packet is dropped and a counter is incremented. This feature is supported on both IPv4 (inet) and IPv6 (inet6) address families.

To configure unicast RPF loose mode with the ability to discard packets, include the **rpf-loose-mode-discard family inet** statement at the **[edit forwarding-options]** hierarchy level:

```

rpf-loose-mode-discard {
  family {
    inet;
  }
}

```

In this example, no special configuration beyond device initialization is required.

Configure unicast RPF loose mode, and apply a fail filter that allows the interface to accept BOOTP packets and DHCP packets. The filter accepts all packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255.

To configure unicast RPF loose mode with the ability to discard packets:

1. Configure the fail filter:

```

[edit firewall]
filter rpf-special-case-dhcp-bootp {
  term allow-dhcp-bootp {
    from {
      source-address {
        0.0.0.0/32;

```

```
    }
    address {
        255.255.255.255/32;
    }
}
then {
    count rpf-dhcp-bootp-traffic;
    accept;
}
}
term default {
    then {
        log;
        reject;
    }
}
}
```

2. Configure unicast RPF on interfaces:

```
[edit]
interfaces {
    so-0/0/0 {
        unit 0 {
            family inet {
                rpf-check fail-filter rpf-special-case-dhcp-bootp;
                mode loose;
            }
        }
    }
}
```

3. Configure the ability to discard packets.

```
[edit]
forwarding-options {
    rpf-loose-mode-discard {
        family {
            inet;
        }
    }
}
```

4. Commit the configuration.

```
[edit]
commit;
```

Configuring Unicast RPF on a VPN

You can configure unicast RPF on a VPN interface by enabling unicast RPF on the interface and including the **interface** statement at the `[edit routing-instances routing-instance-name]` hierarchy level.

You can configure unicast RPF only on the interfaces you specify in the routing instance. This means the following:

- For Layer 3 VPNs, unicast RPF is supported on the CE router interface.
- Unicast RPF is not supported on core-facing interfaces.
- For virtual-router routing instances, unicast RPF is supported on all interfaces you specify in the routing instance.
- If an input filter forwards packets anywhere other than the routing instance the input interface is configured for, the unicast RPF check is not performed.

For more information about VPNs and virtual-router routing instances, see the *Junos OS VPNs Library for Routing Devices*. For more information about FBF, see the *Junos OS Routing Protocols Library for Routing Devices*.

Configure unicast RPF on a Layer 3 VPN interface:

```
[edit interfaces]
so-0/0/0 {
  unit 0 {
    family inet {
      rpf-check;
    }
  }
}
[edit routing-instance]
VPN-A {
  interface so-0/0/0.0;
}
```

Configuring Unicast RPF

Configure unicast RPF strict mode, and apply a fail filter that allows the interface to accept BOOTP packets and DHCP packets. The filter accepts all packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255.

```
[edit firewall]
filter rpf-special-case-dhcp-bootp {
  term allow-dhcp-bootp {
    from {
      source-address {
        0.0.0.0/32;
      }
      address {
        255.255.255.255/32;
      }
    }
    then {
      count rpf-dhcp-bootp-traffic;
      accept;
    }
  }
  term default {
    then {
```

```
        log;
        reject;
    }
}
[edit]
interfaces {
  so-0/0/0 {
    unit 0 {
      family inet {
        rpf-check fail-filter rpf-special-case-dhcp-bootp;
      }
    }
  }
}
```

Example: Configuring Unicast Reverse-Path-Forwarding Check

- [Understanding Unicast Reverse Path Forwarding on page 226](#)
- [Example: Configuring Unicast Reverse-Path-Forwarding Check on page 226](#)

Understanding Unicast Reverse Path Forwarding

IP spoofing can occur during a denial-of-service (DoS) attack. IP spoofing allows an intruder to pass IP packets to a destination as genuine traffic, when in fact the packets are not actually meant for the destination. This type of spoofing is harmful because it consumes the destination's resources.

A unicast reverse-path-forwarding (RPF) check is a tool to reduce forwarding of IP packets that might be spoofing an address. A unicast RPF check performs a route table lookup on an IP packet's source address, and checks the incoming interface. The router or switch determines whether the packet is arriving from a path that the sender would use to reach the destination. If the packet is from a valid path, the router or switch forwards the packet to the destination address. If it is not from a valid path, the router or switch discards the packet. Unicast RPF is supported for the IPv4 and IPv6 protocol families, as well as for the virtual private network (VPN) address family.



NOTE: Reverse path forwarding is not supported on the interfaces you configure as tunnel sources. This affects only the transit packets exiting the tunnel.

Example: Configuring Unicast Reverse-Path-Forwarding Check

Unicast reverse path forwarding (RPF) helps protect against DoS and DDoS attacks by verifying the unicast source address of each packet that arrives on an ingress interface where unicast RPF is enabled.

This example shows how to help defend ingress interfaces against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by configuring unicast RPF to filter incoming traffic.

- [Requirements on page 227](#)
- [Overview on page 227](#)
- [Configuration on page 228](#)
- [Verification on page 233](#)

Requirements

In this example, no special configuration beyond device initialization is required.

Overview

Large amounts of unauthorized traffic such as attempts to flood a network with fake (bogus) service requests in a DoS attack can consume network resources and deny service to legitimate users. One way to help prevent DoS and DDoS attacks is to verify that incoming traffic originates from legitimate network sources.

Unicast RPF helps ensure that a traffic source is legitimate (authorized) by comparing the source address of each packet that arrives on an interface to the forwarding table entry for its source address. If the device uses the same interface that the packet arrived on to reply to the packet's source, this verifies that the packet originated from an authorized source, and the device forwards the packet. If the device does not use the same interface that the packet arrived on to reply to the packet's source, the packet might have originated from an unauthorized source, and the device discards the packet.

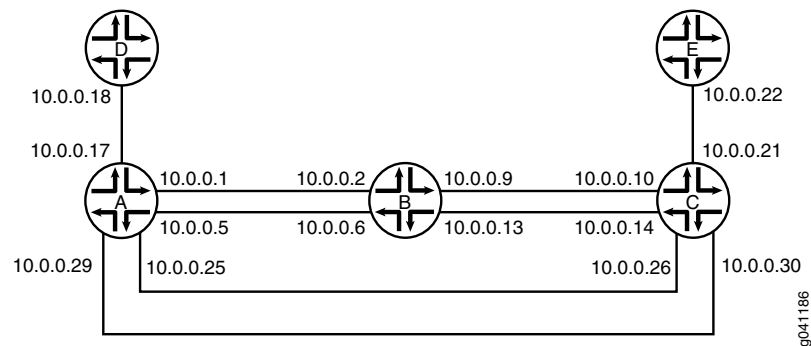
In this example, Device B has unicast RPF configured. Device A is using OSPF to advertise a prefix for the link that connects to Device D. OSPF is enabled on the links between Device B and Device C and the links between Device A and Device C, but not on the links between Device A and Device B. Therefore, Device B learns about the route to Device D through Device C.

If ingress filtering is used in an environment where DHCP or BOOTP is used, it should be ensured that the packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255 are allowed to reach the relay agent in routers when appropriate.

This example also includes a fail filter. When a packet fails the unicast RPF check, the fail filter is evaluated to determine if the packet should be accepted anyway. The fail filter in this example allows Device B's interfaces to accept Dynamic Host Configuration Protocol (DHCP) packets. The filter accepts all packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255.

[Figure 13 on page 228](#) shows the sample network.

Figure 13: Unicast RPF Sample Topoolgy



Configuration

CLI Quick Configuration To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

- Device A**
- ```

set interfaces fe-1/2/0 unit 1 family inet address 10.0.0.1/30
set interfaces fe-0/0/2 unit 5 family inet address 10.0.0.5/30
set interfaces fe-0/0/1 unit 17 family inet address 10.0.0.17/30
set interfaces fe-0/1/1 unit 25 family inet address 10.0.0.25/30
set interfaces fe-1/1/1 unit 29 family inet address 10.0.0.29/30
set protocols ospf export send-direct
set protocols ospf area 0.0.0.0 interface fe-0/1/1.25
set protocols ospf area 0.0.0.0 interface fe-1/1/1.29
set policy-options policy-statement send-direct from protocol direct
set policy-options policy-statement send-direct from route-filter 10.0.0.16/30 exact
set policy-options policy-statement send-direct then accept

```
- Device B**
- ```

set interfaces fe-1/2/0 unit 2 family inet rpf-check fail-filter rpf-special-case-dhcp
set interfaces fe-1/2/0 unit 2 family inet address 10.0.0.2/30
set interfaces fe-1/1/1 unit 6 family inet rpf-check fail-filter rpf-special-case-dhcp
set interfaces fe-1/1/1 unit 6 family inet address 10.0.0.6/30
set interfaces fe-0/1/1 unit 9 family inet rpf-check fail-filter rpf-special-case-dhcp
set interfaces fe-0/1/1 unit 9 family inet address 10.0.0.9/30
set interfaces fe-0/1/0 unit 13 family inet rpf-check fail-filter rpf-special-case-dhcp
set interfaces fe-0/1/0 unit 13 family inet address 10.0.0.13/30
set protocols ospf area 0.0.0.0 interface fe-0/1/1.9
set protocols ospf area 0.0.0.0 interface fe-0/1/0.13
set routing-options forwarding-table unicast-reverse-path active-paths
set firewall filter rpf-special-case-dhcp term allow-dhcp from source-address 0.0.0.0/32
set firewall filter rpf-special-case-dhcp term allow-dhcp from destination-address 255.255.255.255/32
set firewall filter rpf-special-case-dhcp term allow-dhcp then count rpf-dhcp-traffic
set firewall filter rpf-special-case-dhcp term allow-dhcp then accept
set firewall filter rpf-special-case-dhcp term default then log
set firewall filter rpf-special-case-dhcp term default then reject

```
- Device C**
- ```

set interfaces fe-1/2/0 unit 10 family inet address 10.0.0.10/30
set interfaces fe-0/0/2 unit 14 family inet address 10.0.0.14/30
set interfaces fe-1/0/2 unit 21 family inet address 10.0.0.21/30

```

```

set interfaces fe-1/2/2 unit 26 family inet address 10.0.0.26/30
set interfaces fe-1/2/1 unit 30 family inet address 10.0.0.30/30
set protocols ospf area 0.0.0.0 interface fe-1/2/0.10
set protocols ospf area 0.0.0.0 interface fe-0/0/2.14
set protocols ospf area 0.0.0.0 interface fe-1/2/2.26
set protocols ospf area 0.0.0.0 interface fe-1/2/1.30

```

Device D     set interfaces fe-1/2/0 unit 18 family inet address 10.0.0.18/30

Device E     set interfaces fe-1/2/0 unit 22 family inet address 10.0.0.22/30

### Configuring Device A

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure Device A:

1. Configure the interfaces.  

```

[edit interfaces]
user@A# set fe-1/2/0 unit 1 family inet address 10.0.0.1/30

user@A# set fe-0/0/2 unit 5 family inet address 10.0.0.5/30

user@A# set fe-0/0/1 unit 17 family inet address 10.0.0.17/30

user@A# set fe-0/1/1 unit 25 family inet address 10.0.0.25/30

user@A# set fe-1/1/1 unit 29 family inet address 10.0.0.29/30

```
2. Configure OSPF.  

```

[edit protocols ospf]
user@A# set export send-direct
user@A# set area 0.0.0.0 interface fe-0/1/1.25
user@A# set area 0.0.0.0 interface fe-1/1/1.29

```
3. Configure the routing policy.  

```

[edit policy-options policy-statement send-direct]
user@A# set from protocol direct
user@A# set from route-filter 10.0.0.16/30 exact
user@A# set then accept

```
4. If you are done configuring Device A, commit the configuration.  

```

[edit]
user@A# commit

```

### Configuring Device B

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure Device B:

1. Configure the interfaces.  

```
[edit interfaces]
user@B# set fe-1/2/0 unit 2 family inet address 10.0.0.2/30

user@B# set fe-1/1/1 unit 6 family inet address 10.0.0.6/30

user@B# set fe-0/1/1 unit 9 family inet address 10.0.0.9/30

user@B# set fe-0/1/0 unit 13 family inet address 10.0.0.13/30
```
2. Configure OSPF.  

```
[edit protocols ospf area 0.0.0.0]
user@B# set interface fe-0/1/1.9
user@B# set interface fe-0/1/0.13
```
3. Configure unicast RPF, and apply the optional fail filter.  

```
[edit interfaces]
user@B# set fe-1/2/0 unit 2 family inet rpf-check fail-filter rpf-special-case-dhcp

user@B# set fe-1/1/1 unit 6 family inet rpf-check fail-filter rpf-special-case-dhcp

user@B# set fe-0/1/1 unit 9 family inet rpf-check fail-filter rpf-special-case-dhcp

user@B# set fe-0/1/0 unit 13 family inet rpf-check fail-filter rpf-special-case-dhcp
```
4. (Optional) Configure the fail filter that gets evaluated if a packet fails the RPF check.  

```
[edit firewall filter rpf-special-case-dhcp]
user@B# set term allow-dhcp from source-address 0.0.0.0/32
user@B# set term allow-dhcp from destination-address 255.255.255.255/32
user@B# set term allow-dhcp then count rpf-dhcp-traffic
user@B# set term allow-dhcp then accept
user@B# set term default then log
user@B# set term default then reject
```
5. (Optional) Configure only active paths to be considered in the RPF check.  
This is the default behavior.  

```
[edit routing-options forwarding-table]
user@B# set unicast-reverse-path active-paths
```
6. If you are done configuring Device B, commit the configuration.  

```
[edit]
user@B# commit
```



**Results**

Confirm your configuration by issuing the **show firewall**, **show interfaces**, **show protocols**, **show routing-options**, and **show policy-options** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```

Device A user@A# show interfaces
fe-1/2/0 {
 unit 1 {
 family inet {
 address 10.0.0.1/30;
 }
 }
}
fe-0/0/2 {
 unit 5 {
 family inet {
 address 10.0.0.5/30;
 }
 }
}
fe-0/0/1 {
 unit 17 {
 family inet {
 address 10.0.0.17/30;
 }
 }
}
fe-0/1/1 {
 unit 25 {
 family inet {
 address 10.0.0.25/30;
 }
 }
}
fe-1/1/1 {
 unit 29 {
 family inet {
 address 10.0.0.29/30;
 }
 }
}

user@A# show protocols
ospf {
 export send-direct;
 area 0.0.0.0 {
 interface fe-0/1/1.25;
 interface fe-1/1/1.29;
 }
}

user@A# show policy-options
policy-statement send-direct {
 from {

```

```
 protocol direct;
 route-filter 10.0.0.16/30 exact;
 }
 then accept;
}

Device B user@B# show firewall
filter rpf-special-case-dhcp {
 term allow-dhcp {
 from {
 source-address {
 0.0.0.0/32;
 }
 destination-address {
 255.255.255.255/32;
 }
 destination-address {
 255.255.255.255/32;
 }
 }
 then {
 count rpf-dhcp-traffic;
 accept;
 }
 }
 term default {
 then {
 log;
 reject;
 }
 }
}

user@B# show interfaces
fe-1/2/0 {
 unit 2 {
 family inet {
 rpf-check fail-filter rpf-special-case-dhcp;
 address 10.0.0.2/30;
 }
 }
}
fe-1/1/1 {
 unit 6 {
 family inet {
 rpf-check fail-filter rpf-special-case-dhcp;
 address 10.0.0.6/30;
 }
 }
}
fe-0/1/1 {
 unit 9 {
 family inet {
 rpf-check fail-filter rpf-special-case-dhcp;
 address 10.0.0.9/30;
 }
 }
}
```

```
}
fe-0/1/0 {
 unit 13 {
 family inet {
 rpf-check fail-filter rpf-special-case-dhcp;
 address 10.0.0.13/30;
 }
 }
}
```

user@B# show protocols

```
ospf {
 area 0.0.0.0 {
 interface fe-0/1/1.9;
 interface fe-0/1/0.13;
 }
}
```

user@B# show routing-options

```
forwarding-table {
 unicast-reverse-path active-paths;
}
```

Enter the configurations on Device C, Device D, and Device E, as shown in [“CLI Quick Configuration” on page 228](#).

---

### Verification

Confirm that the configuration is working properly.

- [Confirm That Unicast RPF Is Enabled on page 233](#)
- [Confirm That the Source Addresses Are Blocked on page 234](#)
- [Confirm That the Source Addresses Are Unblocked on page 234](#)

#### *Confirm That Unicast RPF Is Enabled*

**Purpose** Make sure that the interfaces on Device B have unicast RPF enabled.

**Action** user@B> show interfaces fe-0/1/0.13 extensive  
Logical interface fe-0/1/0.13 (Index 73) (SNMP ifIndex 553) (Generation 208)  
Flags: SNMP-Traps 0x4000 Encapsulation: ENET2  
Traffic statistics:  
Input bytes : 999390  
Output bytes : 1230122  
Input packets: 12563  
Output packets: 12613  
Local statistics:  
Input bytes : 998994  
Output bytes : 1230122  
Input packets: 12563  
Output packets: 12613  
Transit statistics:  
Input bytes : 396 0 bps  
Output bytes : 0 0 bps  
Input packets: 0 0 pps  
Output packets: 0 0 pps  
Protocol inet, MTU: 1500, Generation: 289, Route table: 22  
Flags: Sendbcst-pkt-to-re, uRPF  
RPF Failures: Packets: 0, Bytes: 0  
Addresses, Flags: Is-Preferred Is-Primary  
Destination: 10.0.0.12/30, Local: 10.0.0.13, Broadcast: 10.0.0.15,  
Generation: 241

**Meaning** The uRPF flag confirms that unicast RPF is enabled on this interface.

#### *Confirm That the Source Addresses Are Blocked*

**Purpose** Use the ping command to make sure that Device B blocks traffic from unexpected source addresses.

**Action** From Device A, ping Device B's interfaces, using 10.0.0.17 as the source address.

```
user@A> ping 10.0.0.6 source 10.0.0.17
PING 10.0.0.6 (10.0.0.6): 56 data bytes
^C
--- 10.0.0.6 ping statistics ---
3 packets transmitted, 0 packets received, 100% packet loss
```

**Meaning** As expected, the ping operation fails.

#### *Confirm That the Source Addresses Are Unblocked*

**Purpose** Use the ping command to make sure that Device B does not block traffic when the RPF check is deactivated.

**Action** 1. Deactivate the RPF check on one of the interfaces.  
2. Rerun the ping operation.

```
user@B> deactivate interfaces fe-1/1/1.6 family inet rpf-check

user@A> ping 10.0.0.6 source 10.0.0.17
PING 10.0.0.2 (10.0.0.2): 56 data bytes
64 bytes from 10.0.0.2: icmp_seq=0 ttl=63 time=1.316 ms
```

```
64 bytes from 10.0.0.2: icmp_seq=1 ttl=63 time=1.263 ms
^C
--- 10.0.0.2 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max/stddev = 1.263/1.289/1.316/0.027 ms
```

**Meaning** As expected, the ping operation succeeds.

**Related Documentation**

- [Example: Enabling Indirect Next Hops on the Packet Forwarding Engine](#)

## Enabling Source Class and Destination Class Usage

- [Source Class and Destination Class Usage on page 235](#)
- [Enabling Source Class and Destination Class Usage on page 238](#)

### Source Class and Destination Class Usage

For interfaces that carry IPv4, IPv6, MPLS, or peer AS billing traffic, you can maintain packet counts based on the entry and exit points for traffic passing through your network. Entry and exit points are identified by source and destination prefixes grouped into disjoint sets defined as *source classes* and *destination classes*. You can define classes based on a variety of parameters, such as routing neighbors, autonomous systems, and route filters.

Source class usage (SCU) counts packets sent to customers by performing lookup on the IP source address. SCU makes it possible to track traffic originating from specific prefixes on the provider core and destined for specific prefixes on the customer edge. You must enable SCU accounting on both the inbound and outbound physical interfaces, and the route for the source of the packet must be in located in the forwarding table.



**NOTE:** SCU and DCU accounting do not work with directly connected interface routes. Source class usage does not count packets coming from sources with direct routes in the forwarding table because of software architecture limitations.

Destination class usage (DCU) counts packets from customers by performing lookup of the IP destination address. DCU makes it possible to track traffic originating from the customer edge and destined for specific prefixes on the provider core router.



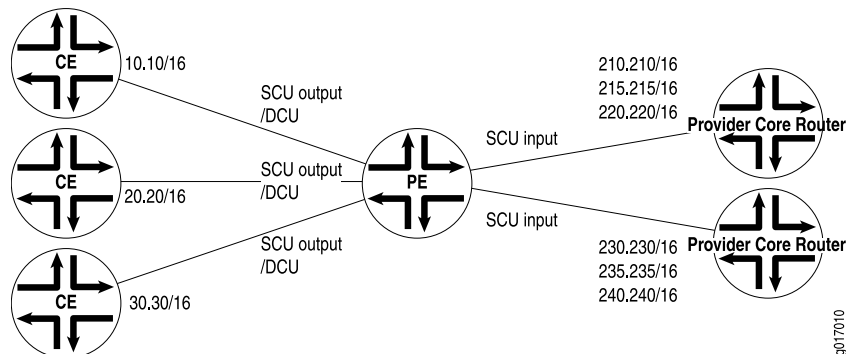
**NOTE:** We recommend that you stop the network traffic on an interface before you modify the DCU or SCU configuration for that interface. Modifying the DCU or SCU configuration without stopping the traffic might corrupt the DCU or SCU statistics. Before you restart the traffic after modifying the configuration, enter the `clear interfaces statistics` command.

[Figure 14 on page 236](#) illustrates an Internet service provider (ISP) network. In this topology, you can use DCU to count packets customers send to specific prefixes. For example, you

can have three counters, one per customer, that count the packets destined for prefix **210.210/16** and **220.220/16**.

You can use SCU to count packets the provider sends from specific prefixes. For example, you can count the packets sent from prefix **210.210/16** and **215.215/16** and transmitted on a specific output interface.

**Figure 14: Prefix Accounting with Source and Destination Classes**



You can configure up to 126 source classes and 126 destination classes. For each interface on which you enable destination class usage and source class usage, the Junos OS maintains an interface-specific counter for each corresponding class up to the 126 class limit.



**NOTE:** For transit packets exiting the router through the tunnel, forwarding path features, such as RPF, forwarding table filtering, source class usage, and destination class usage are not supported on the interfaces you configure as the output interface for tunnel traffic. For firewall filtering, you must allow the output tunnel packets through the firewall filter applied to input traffic on the interface that is the next-hop interface towards the tunnel destination.



**NOTE:**

Performing DCU accounting when an output service is enabled produces inconsistent behavior in the following configuration:

- Both SCU input and DCU are configured on the packet input interface.
- SCU output is configured on the packet output interface.
- Interface services is enabled on the output interface.

For an incoming packet with source and destination prefixes matching the SCU and DCU classes respectively configured in the router, both SCU and DCU counters will be incremented. This behavior is not harmful or negative. However, it is inconsistent with non-serviced packets, in that only the SCU count will be incremented (because the SCU class ID will override the DCU class ID in this case).

To enable packet counting on an interface, include the **accounting** statement:

```
accounting {
 destination-class-usage;
 source-class-usage {
 direction;
 }
}
```

**direction** can be one of the following:

- **input**—Configure at least one expected ingress point.
- **output**—Configure at least one expected egress point.
- **input output**—On a single interface, configure at least one expected ingress point and one expected egress point.

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6 | mpls)]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6 | mpls)]

For SCU to work, you must configure at least one input interface and at least one output interface.

The ability to count a single packet for both SCU and DCU accounting depends on the underlying physical interface.

- For traffic over MPC/MIC interfaces, a single incoming packet is counted for both SCU and DCU accounting if both SCU and DCU are configured. To ensure the outgoing packet is counted, include the **source-class-usage output** statements in the configuration of the outgoing interface.
- For traffic over DPC interfaces, an incoming packet is counted only once, and SCU takes priority over DCU. This means that when a packet arrives on an interface on which you include the **source-class-usage input** and **destination-class-usage** statements in the configuration, and when the source and destination both match accounting prefixes, the Junos OS associates the packet with the source class only.

For traffic over MPC interfaces, SCU and DCU accounting is performed after output filters are evaluated. If a packet matches a firewall filter match condition, the packet is included in SCU or DCU accounting except in the case where the action of the matched term is **discard**.

On T Series, M120, and M320 routers, the source class and destination classes are not carried across the router fabric. The implications of this are as follows:

- On T Series, M120, and M320 routers, SCU and DCU accounting is performed before the packet enters the fabric.
- On M7i, M10i, M120, and M320 routers, on MX Series routers with non-MPC, and on T Series routers, SCU and DCU accounting is performed before output filters are

evaluated. Consequently, if a packet matches a firewall filter match condition, the packet is included in SCU or DCU accounting; the packet is counted for any term action (including the **discard** action).

- On M120, M320, and T Series routers, the **destination-class** and **source-class** statements are supported at the **[edit firewall family family-name filter filter-name term term-name from]** hierarchy level only for the filter applied to the forwarding table. On M7i, M10i, and MX Series routers, these statements are supported.

Once you enable accounting on an interface, the Junos OS maintains packet counters for that interface, with separate counters for **inet**, **inet6**, and **mpls** protocol families. You must then configure the source class and destination class attributes in policy action statements, which must be included in forwarding-table export policies.



**NOTE:** When configuring policy action statements, you can configure only one source class for each matching route. In other words, more than one source class cannot be applied to the same route.

In Junos OS Release 9.3 and later, you can configure SCU accounting for Layer 3 VPNs configured with the **vrf-table-label** statement. Include the **source-class-usage** statement at the **[edit routing-instances routing-instance-name vrf-table-label]** hierarchy level. The **source-class-usage** statement at this hierarchy level is supported only for the virtual routing and forwarding (VRF) instance type.

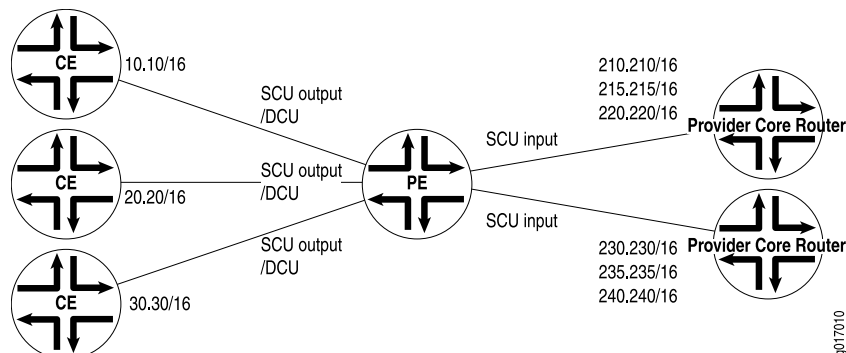


**NOTE:** DCU counters cannot be enabled on the label-switched interface (LSI) that is created dynamically when the **vrf-table-label** statement is configured within a VRF. For more information, see the *Junos OS VPNs Library for Routing Devices*.

For a complete discussion about source and destination class accounting profiles, see the *Network Management Administration Guide for Routing Devices*. For more information about MPLS, see the *MPLS Applications Feature Guide for Routing Devices*.

## Enabling Source Class and Destination Class Usage

Figure 15: Prefix Accounting with Source and Destination Classes





Configure DCU and SCU output on one interface:

```
[edit]
interfaces {
 so-6/1/0 {
 unit 0 {
 family inet {
 accounting {
 destination-class-usage;
 source-class-usage {
 output;
 }
 }
 }
 }
 }
}
```

### 1. Complete SCU Configuration

Source routers A and B use loopback addresses as the prefixes to be monitored. Most of the configuration tasks and actual monitoring occur on transit Router SCU.

The loopback address on Router A contains the origin of the prefix that is to be assigned to source class A on Router SCU. However, no SCU processing happens on this router. Therefore, configure Router A for basic OSPF routing and include your loopback interface and interface **so-0/0/2** in the OSPF process.

### 2. Router A

```
[edit]
interfaces {
 so-0/0/2 {
 unit 0 {
 family inet {
 address 10.255.50.2/24;
 }
 }
 }
 lo0 {
 unit 0 {
 family inet {
 address 10.255.192.10/32;
 }
 }
 }
}
protocols {
 ospf {
 area 0.0.0.0 {
 interface so-0/0/2.0;
 interface lo0.0;
 }
 }
}
```

### 3. Router SCU

Last, apply the policy to the forwarding table.

Router SCU handles the bulk of the activity in this example. On Router SCU, enable source class usage on the inbound and outbound interfaces at the **[edit interfaces interface-name unit unit-number family inet accounting]** hierarchy level. Make sure you specify the expected traffic: input, output, or, in this case, both.

Next, configure a route filter policy statement that matches the prefixes of the loopback addresses from routers A and B. Include statements in the policy that classify packets from Router A in one group named **scu-class-a** and packets from Router B in a second class named **scu-class-b**. Notice the efficient use of a single policy containing multiple terms.

```
[edit]
interfaces {
 so-0/0/1 {
 unit 0 {
 family inet {
 accounting {
 source-class-usage {
 input;
 output;
 }
 }
 address 10.255.50.1/24;
 }
 }
 }
 so-0/0/3 {
 unit 0 {
 family inet {
 accounting {
 source-class-usage {
 input;
 output;
 }
 }
 address 10.255.10.3/24;
 }
 }
 }
 lo0 {
 unit 0 {
 family inet {
 address 10.255.6.111/32;
 }
 }
 }
}
protocols {
 ospf {
 area 0.0.0.0 {
 interface so-0/0/1.0;
 interface so-0/0/3.0;
 }
 }
}
```

```

 }
 }
 routing-options {
 forwarding-table {
 export scu-policy;
 }
 }
 policy-options {
 policy-statement scu-policy {
 term 0 {
 from {
 route-filter 10.255.192.0/24 orlonger;
 }
 then source-class scu-class-a;
 }
 term 1 {
 from {
 route-filter 10.255.165.0/24 orlonger;
 }
 then source-class scu-class-b;
 }
 }
 }
}

```

#### 4. Router B

Just as Router A provides a source prefix, Router B's loopback address matches the prefix assigned to **scu-class-b** on Router SCU. Again, no SCU processing happens on this router, so configure Router B for basic OSPF routing and include your loopback interface and interface **so-0/0/4** in the OSPF process.

```

interfaces {
 so-0/0/4 {
 unit 0 {
 family inet {
 address 10.255.10.4/24;
 }
 }
 }
 lo0 {
 unit 0 {
 family inet {
 address 10.255.165.226/32;
 }
 }
 }
}
protocols {
 ospf {
 area 0.0.0.0 {
 interface so-0/0/4.0;
 interface lo0.0;
 }
 }
}

```

### 5. Enabling Packet Counting for Layer 3 VPNs

You can use SCU and DCU to count packets on Layer 3 VPNs. To enable packet counting for Layer 3 VPN implementations at the egress point of the MPLS tunnel, you must configure a virtual loopback tunnel interface (**vt**) on the PE router, map the virtual routing and forwarding (VRF) instance type to the virtual loopback tunnel interface, and send the traffic received from the VPN out the source class output interface, as shown in the following example:

Configure a virtual loopback tunnel interface on a provider edge router equipped with a tunnel PIC:

```
[edit interfaces]
vt-0/3/0 {
 unit 0 {
 family inet {
 accounting {
 source-class-usage {
 input;
 }
 }
 }
 }
}
```

### 6. Map the VRF instance type to the virtual loopback tunnel interface.

In Junos OS Release 9.3 and later, you can configure SCU accounting for Layer 3 VPNs configured with the **vrf-table-label** statement. Include the **source-class-usage** statement at the **[edit routing-instances routing-instance-name vrf-table-label]** hierarchy level. The **source-class-usage** statement at this hierarchy level is supported only for the virtual routing and forwarding (VRF) instance type. DCU is not supported when the **vrf-table-label** statement is configured. For more information, see the *Junos OS VPNs Library for Routing Devices*.

```
[edit routing-instances]
VPN-A {
 instance-type vrf;
 interface at-2/1/1.0;
 interface vt-0/3/0.0;
 route-distinguisher 10.255.14.225:100;
 vrf-import import-policy-A;
 vrf-export export-policy-A;
 protocols {
 bgp {
 group to-r4 {
 local-address 10.27.253.1;
 peer-as 400;
 neighbor 10.27.253.2;
 }
 }
 }
}
```

### 7. Send traffic received from the VPN out the source class output interface:

```
[edit interfaces]
at-2/1/0 {
```

```

unit 0 {
 family inet {
 accounting {
 source-class-usage {
 output;
 }
 }
 }
}

```

For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*.  
 For more information about virtual loopback tunnel interfaces, see the *Junos OS Services Interfaces Library for Routing Devices*.

## Understanding Targeted Broadcast

Targeted broadcast is a process of flooding a target subnet with Layer 3 broadcast IP packets originating from a different subnet. The intent of targeted broadcast is to flood the target subnet with the broadcast packets on a LAN interface without broadcasting to the entire network. Targeted broadcast is configured with various options on the egress interface of the router or switch and the IP packets are broadcast only on the LAN (egress) interface. Targeted broadcast helps you implement remote administration tasks such as backups and wake-on LAN (WOL) on a LAN interface, and supports virtual routing and forwarding (VRF) instances.

Regular Layer 3 broadcast IP packets originating from a subnet are broadcast within the same subnet. When these IP packets reach a different subnet, they are forwarded to the Routing Engine (to be forwarded to other applications). Because of this, remote administration tasks such as backups cannot be performed on a particular subnet through another subnet. As a workaround you can enable targeted broadcast, to forward broadcast packets that originate from a different subnet.

Layer 3 broadcast IP packets have a destination IP address that is a valid broadcast address for the target subnet. These IP packets traverse the network in the same way as unicast IP packets until they reach the destination subnet. In the destination subnet, if the receiving router has targeted broadcast enabled on the egress interface, the IP packets are forwarded to an egress interface and the Routing Engine or to an egress interface only. The IP packets are then translated into broadcast IP packets which flood the target subnet only through the LAN interface (if there is no LAN interface, the packets are discarded), and all hosts on the target subnet receive the IP packets. If targeted broadcast is not enabled on the receiving router, the IP packets are treated as regular Layer 3 broadcast IP packets and are forwarded to the Routing Engine. If targeted broadcast is enabled without any options, the IP packets are forwarded to the Routing Engine.

Targeted broadcast can be configured to forward the IP packets only to an egress interface, which is helpful when the router is flooded with packets to process, or to both an egress interface and the Routing Engine.



**NOTE:** Targeted broadcast does not work when the targeted broadcast option `forward-and-send-to-re` and the traffic sampling option `sampling` are configured on the same egress interface of an M320 router, a T640 router, or an MX960 router. To overcome this scenario, you must either disable one of these options or enable the sampling option with the targeted broadcast option `forward-only` on the egress interface. For information about traffic sampling, see *Configuring Traffic Sampling*.



**NOTE:** Any firewall filter that is configured on the Routing Engine loopback interface (lo0) cannot be applied to IP packets that are forwarded to the Routing Engine as a result of a targeted broadcast. This is because broadcast packets are forwarded as flood next hop and not as local next hop traffic, and you can only apply a firewall filter to local next hop routes for traffic directed towards the Routing Engine.

- Related Documentation**
- [Configuring Targeted Broadcast on page 244](#)
  - [targeted-broadcast on page 878](#)

---

## Configuring Targeted Broadcast

The following sections explain how to configure targeted broadcast on an egress interface and its options:

- [Configuring Targeted Broadcast and Its Options on page 244](#)
- [Display Targeted Broadcast Configuration Options on page 245](#)

### Configuring Targeted Broadcast and Its Options

You can configure targeted broadcast on an egress interface with different options. You can either allow the IP packets destined for a Layer 3 broadcast address to be forwarded on the egress interface and to send a copy of the IP packets to the Routing Engine or you can allow the IP packets to be forwarded on the egress interface only. Note that the packets are broadcast only if the egress interface is a LAN interface.

To configure targeted broadcast and its options:

1. Configure the physical interface.

[edit]

user@host# **set interfaces *interface-name***

2. Configure the logical unit number at the [edit interfaces *interface-name* hierarchy level.

[edit interfaces *interface-name*]

user@host# **set unit *logical-unit-number***

3. Configure the protocol family as `inet` at the [edit interfaces *interface-name* unit *interface-unit-number* hierarchy level.

```
[edit interfaces interface-name unit interface--unit-number]
user@host# set family inet
```

4. Configure targeted broadcast at the `[edit interfaces interface-name unit interface-unit-number family inet]` hierarchy level

```
[edit interfaces interface-name unit interface--unit-number family inet]
user@host# set targeted-broadcast
```

5. Specify one of the following options as per requirement:

- To allow IP packets destined for a Layer 3 broadcast address to be forwarded on the egress interface and to send a copy of the IP packets to the Routing Engine.

```
[edit interfaces interface-name unit interface-unit-number family inet
targeted-broadcast]
user@host# set forward-and-send-to-re
```

- To allow IP packets to be forwarded on the egress interface only.

```
[edit interfaces interface-name unit interface-unit-number family inet
targeted-broadcast]
user@host# set forward-only
```



**NOTE:** Targeted broadcast does not work when the targeted broadcast option `forward-and-send-to-re` and the traffic sampling option `sampling` are configured on the same egress interface of an M320 router, a T640 router, or an MX960 router. To overcome this scenario, you must either disable one of these options or enable the `sampling` option with the targeted broadcast option `forward-only` on the egress interface. For information about traffic sampling, see *Configuring Traffic Sampling*.

## Display Targeted Broadcast Configuration Options

The following topics display targeted broadcast configuration with its various options:

- [Forward IP Packets On the Egress Interface and To the Routing Engine on page 245](#)
- [Forward IP Packets On the Egress Interface Only on page 246](#)

### Forward IP Packets On the Egress Interface and To the Routing Engine

**Purpose** Display the configuration when targeted broadcast is configured on the egress interface to forward the IP packets on the egress interface and to send a copy of the IP packets to the Routing Engine.

**Action** To display the configuration run the `show` command at the `[edit interfaces interface-name unit interface-unit-number family inet]` where the interface name is `ge-2/0/0`, the unit value is set to `0`, the protocol family is set to `inet`.

```
[edit interfaces interface-name unit interface-unit-number family inet]
user@host#show
targeted-broadcast {
 forward-and-send-to-re;
}
```

### Forward IP Packets On the Egress Interface Only

---

**Purpose** Display the configuration when targeted broadcast is configured on the egress interface to forward the IP packets on the egress interface only.

**Action** To display the configuration run the **show** command at the **[edit interfaces *interface-name* unit *interface-unit-number* family inet]** where the interface name is ge-2/0/0, the unit value is set to 0, the protocol family is set to inet.

```
[edit interfaces interface-name unit interface-unit-number family inet]
user@host#show
targeted-broadcast {
 forward-only;
}
```

**Related Documentation**

- [targeted-broadcast on page 878](#)
- [Understanding Targeted Broadcast on page 243](#)



## CHAPTER 5

# Configuring Circuit and Translational Cross-Connects

- [Circuit and Translational Cross-Connects Overview on page 247](#)
- [Defining the Encapsulation for Switching Cross-Connects on page 249](#)
- [Defining the Connection for Switching Cross-Connects on page 253](#)
- [Configuring MPLS for Switching Cross-Connects on page 253](#)
- [Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 253](#)
- [Configuring ATM-to-Ethernet Interworking on page 254](#)
- [Example: Configuring a CCC over Frame Relay Encapsulated Interface on page 258](#)
- [Example: Configuring a TCC on page 259](#)
- [Example: Configuring CCC over Aggregated Ethernet on page 260](#)
- [Example: Configuring a Remote LSP CCC over Aggregated Ethernet on page 262](#)
- [Example: Configuring ATM-to-Ethernet Interworking on page 264](#)

## Circuit and Translational Cross-Connects Overview

---

Circuit cross-connect (CCC) and translational cross-connect (TCC) allow you to configure transparent connections between two circuits, where a circuit can be a Frame Relay data-link connection identifier (DLCI), an Asynchronous Transfer Mode (ATM) virtual circuit (VC), a Point-to-Point Protocol (PPP) interface, a Cisco High-level Data Link Control (HDLC) interface, or a Multiprotocol Label Switching (MPLS) label-switched path (LSP).

Using CCC or TCC, packets from the source circuit are delivered to the destination circuit with, at most, the Layer 2 address being changed. No other processing, such as header checksums, time-to-live (TTL) decrementing, or protocol processing, is done.

To connect interfaces of the same type, use CCC. To connect unlike interfaces, use TCC.

CCC and TCC circuits fall into three categories: logical interfaces, which include ATM VCs and Frame Relay DLCIs; physical interfaces, which include PPP and Cisco HDLC; and paths, which include LSPs. The three circuit categories provide three types of cross-connect:

- Layer 2 switching (interface-to-interface)—Cross-connects between logical interfaces provide what is essentially Layer 2 switching.
- MPLS tunneling (interface-to-LSP)—Cross-connects between interfaces and LSPs allow you to connect two distant interface circuits by creating MPLS tunnels that use LSPs as the conduit.
- LSP stitching (LSP-to-LSP)—Cross-connects between LSPs provide a way to “stitch” together two label-switched paths, including paths that fall in two different traffic engineering database (TED) areas.

The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first interface.

For most CCC connections that connect interfaces, the interfaces must be of the same type; that is, ATM to ATM, Frame Relay to Frame Relay, PPP to PPP, or Cisco HDLC to Cisco HDLC.

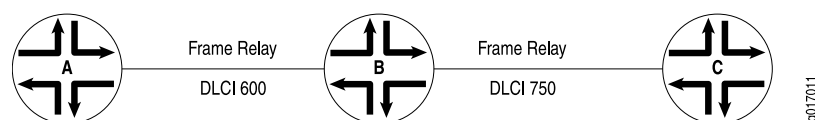
ATM-to-Ethernet interworking cross-connect circuits connect logical interfaces configured on an ATM2 and Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E physical interfaces.

For all TCC connections that connect interfaces, the interfaces can be of unlike types. Mainly, TCC is used for Layer 2.5 virtual private networks (VPNs), but it can also be used as a simple “unlike circuit” switch.

Switching cross-connects join logical interfaces to form what is essentially Layer 2 switching.

[Figure 16 on page 248](#) illustrates a Layer 2 switching circuit cross-connect. In this topology, Router A and Router C have Frame Relay connections to Router B, which is a Juniper Networks router. CCC allows you to configure Router B to act as a Frame Relay (Layer 2) switch. To do this, configure a circuit from Router A to Router C that passes through Router B, effectively configuring Router B as a Frame Relay switch with respect to these routers. This configuration allows Router B to transparently switch packets (frames) between Router A and Router C without regard to the packets’ contents or the Layer 3 protocols. The only processing that Router B performs is to translate DLCI 600 to 750.

**Figure 16: Layer 2 Switching Circuit Cross-Connect**



If the Router A-to-Router B and Router B-to-Router C circuits are PPP, for example, the Link Control Protocol and Network Control Protocol exchanges occur between Router A and Router C. These messages are handled transparently by Router B, allowing

Router A and Router C to use various PPP options (such as header or address compression and authentication) that Router B might not support. Similarly, Router A and Router C exchange keepalives, providing circuit-to-circuit connectivity status.

You can configure Layer 2 switching cross-connects on PPP, Cisco HDLC, Frame Relay, Ethernet CCC, Ethernet VLAN, and ATM circuits. With CCC, only like interfaces can be connected in a single cross-connect. With TCC, unlike interfaces can be connected in a single cross-connect. In Layer 2 switching cross-connects, the exchanges take place between point-to-point links.

This chapter discusses the Layer 2 switching cross-connect configuration tasks. For information about MPLS tunneling and LSP stitching, see the *Junos OS MPLS Applications Library for Routing Devices*.

For information about Layer 2 and Layer 2.5 VPNs, see the *Junos OS VPNs Library for Routing Devices*.

For restrictions for MPLS on QFX switches, see *MPLS Feature Support on QFX Series and EX4600 Switches*.

**Related  
Documentation**

- [Defining the Encapsulation for Switching Cross-Connects on page 249](#)
- [Defining the Connection for Switching Cross-Connects on page 253](#)
- [Configuring MPLS for Switching Cross-Connects on page 253](#)
- [Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 253](#)
- [Configuring ATM-to-Ethernet Interworking on page 254](#)
- [Example: Configuring a CCC over Frame Relay Encapsulated Interface on page 258](#)
- [Example: Configuring a TCC on page 259](#)
- [Example: Configuring CCC over Aggregated Ethernet on page 260](#)
- [Example: Configuring a Remote LSP CCC over Aggregated Ethernet on page 262](#)
- [Example: Configuring ATM-to-Ethernet Interworking on page 264](#)

---

## Defining the Encapsulation for Switching Cross-Connects

- [Defining the Encapsulation for Switching Cross-Connects on page 249](#)
- [Configuring PPP or Cisco HDLC Circuits on page 250](#)
- [Configuring ATM Circuits on page 250](#)
- [Configuring Frame Relay Circuits on page 250](#)
- [Configuring Ethernet CCC Circuits on page 252](#)
- [Configuring Ethernet VLAN Circuits on page 252](#)

## Defining the Encapsulation for Switching Cross-Connects

To configure Layer 2 or Layer 2.5 switching cross-connects, configure the CCC or TCC encapsulation on the router that is acting as the switch (Router B in [Figure 16 on page 248](#)).



**NOTE:** When you use CCC encapsulation, you can configure the `ccc` family only. Likewise, when you use TCC encapsulation, you can configure the `tcc` family only.

This section contains the following topics:

## Configuring PPP or Cisco HDLC Circuits

For PPP or Cisco HDLC circuits, specify the encapsulation by including the **encapsulation** statement at the `[edit interfaces interface-name]` hierarchy level. This statement configures the entire physical device. For these circuits to work, you must configure a logical interface unit 0.

```
[edit interfaces interface-name]
encapsulation (ppp-ccc | cisco-hdlc-ccc | ppp-tcc | cisco-hdlc-tcc);
unit 0;
```

## Configuring ATM Circuits

For ATM circuits, include the **vpi** statement `[edit interfaces interface-name atm-options]` hierarchy level:

```
[edit interfaces at-fpc/pic/port]
atm-options {
 vpi vpi-identifier;
}
```

On the logical interface, include the following statements:

```
point-to-point;
encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-tcc-vc-mux | atm-tcc-snap);
vci vpi-identifier.vci-identifier;
```

You can include the logical interface statements at the following hierarchy levels:

- `[edit interfaces at-fpc/pic/port unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces at-fpc/pic/port unit logical-unit-number]`

For each VC, configure whether it is a circuit or a regular logical interface. The default interface type is point-to-point.

## Configuring Frame Relay Circuits

For Frame Relay circuits, include the **encapsulation** statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
encapsulation type;
```

On the logical interface, include the following statements:

```
point-to-point;
```

```
encapsulation type;
dlci dlci-identifier;
```

You can include the logical interface statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

The encapsulation type can be one of the following:

- Flexible Frame Relay (**flexible-frame-relay**)—Intelligent queuing (IQ) interfaces can use flexible Frame Relay encapsulation. You use flexible Frame Relay encapsulation when you want to configure multiple per-unit Frame Relay encapsulations. This encapsulation type allows you to configure any combination of TCC, CCC, and standard Frame Relay encapsulations on a single physical port. Also, each logical interface can have any DLCI value from 1 through 1022.
- Frame Relay CCC version (**frame-relay-ccc**)—For E1, E3, SONET/SDH, T1, and T3 interfaces, this encapsulation type is the same as standard Frame Relay for DLCIs 0 through 511. DLCIs 512 through 1022 are dedicated to CCC. The logical interface must also have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
- Frame Relay TCC version (**frame-relay-tcc**)—Similar to Frame Relay CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.
- Extended CCC version (**extended-frame-relay-ccc**)—This encapsulation type allows you to dedicate DLCIs 1 through 1022 to CCC. The logical interface must have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
- Extended TCC version (**extended-frame-relay-tcc**)—Similar to extended Frame Relay CCC, this encapsulation type allows you to dedicate DLCIs 1 through 1022 to TCC, which is used for circuits with different media on either side of the connection.
- Port CCC version (**frame-relay-port-ccc**)—Defined in the IETF document *Frame Relay Encapsulation over Pseudo-Wires* (expired December 2002). This encapsulation type allows you to transparently carry all the DLCIs between two customer edge (CE) routers without explicitly configuring each DLCI on the two provider edge (PE) routers with Frame Relay transport. The connection between the two CE routers can be either user-to-network interface (UNI) or network-to-network interface (NNI); this is completely transparent to the PE routers. The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.

For each DLCI, configure whether it is a circuit or a regular logical interface. The DLCI for regular interfaces must be from 1 through 511. For CCC and TCC interfaces, it must be from 512 through 1022. This restriction does not apply to IQ interfaces. The default interface type is point to point.

## Configuring Ethernet CCC Circuits

You can configure Ethernet CCC encapsulation on Fast Ethernet, Gigabit Ethernet, and aggregated Ethernet interfaces.



**NOTE:** CCC over aggregated Ethernet requires an M Series Enhanced Flexible PIC Concentrator (FPC).

For Ethernet CCC circuits, specify the encapsulation by including the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level. This statement configures the entire physical device.

```
[edit interfaces interface-name]
encapsulation ethernet-ccc;
unit logical-unit-number {
 ...
}
[edit interfaces aex]
encapsulation ethernet-ccc;
unit logical-unit-number {
 ...
}
```

## Configuring Ethernet VLAN Circuits

You can configure Ethernet virtual local area network (VLAN) circuits on Fast Ethernet, Gigabit Ethernet, and aggregated Ethernet interfaces. For Ethernet VLAN circuits, specify the encapsulation by including the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level. This statement configures the entire physical device. You must also enable VLAN tagging. To do this, include the following statements:

```
[edit interfaces interface-name]
vlan-tagging;
encapsulation (extended-vlan-ccc | vlan-ccc);
[edit interfaces aex]
vlan-tagging;
encapsulation vlan-ccc;
```

On the logical interface, include the following statements:

```
encapsulation vlan-ccc;
vlan-id number;
```

You can include the logical interface statements at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

Ethernet interfaces in VLAN mode can have multiple logical interfaces. For encapsulation type **vlan-ccc**, VLAN IDs 1 through 511 are reserved for normal VLANs, and VLAN IDs

512 through 1023 are reserved for CCC VLANs. For encapsulation type **extended-vlan-ccc**, VLAN IDs 1 through 4094 are valid. VLAN ID 0 is reserved for tagging the priority of frames.

## Defining the Connection for Switching Cross-Connects

To configure Layer 2 switching cross-connects, define the connection between the two circuits. You configure this on the router that is acting as the switch (Router B in [Figure 16 on page 248](#)). The connection joins the interface that comes from the circuit's source to the interface that leads to the circuit's destination. When you specify the interface names, include the logical portion of the name, which corresponds to the logical unit number. The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first interface.

```
[edit protocols]
connections {
 remote-interface-switch connection-name {
 interface interface-name.unit-number;
 }
 lsp-switch connection-name {
 transmit-lsp lsp-number;
 receive-lsp lsp-number;
 }
}
```

## Configuring MPLS for Switching Cross-Connects

For Layer 2 switching cross-connects to work, you must configure MPLS. The following is a minimal MPLS configuration:

```
[edit protocols]
mpls {
 interface (interface-name | all);
}
```

For more information, see the *MPLS Applications Feature Guide for Routing Devices*.

**Related Documentation**

- [Defining the Connection for Switching Cross-Connects on page 253](#)

## Configuring IS-IS or MPLS Traffic for TCC Interfaces

Layer 2.5 VPNs on T Series, M120, MX Series, and M320 routers support IPv4, IS-IS, and MPLS traffic types. By default, IPv4 traffic runs on T Series, M120, MX Series, and M320 routers and over TCC interfaces. To configure IS-IS (ISO traffic) or MPLS traffic on Layer 2.5 VPNs, you must configure the same traffic type on both ends of the Layer 2.5 VPN.



**NOTE:** Some platform and FPC combinations can not pass TCC encapsulated ISO traffic. See *Platforms/FPCs That Cannot Forward TCC Encapsulated ISO Traffic* for details.

To specify which traffic can run over a TCC interface, include the **protocols** statement with the appropriate value (**inet**, **mpls**, and **iso**) at the **[edit interfaces *interface-name* unit *logical-unit-number* family *tcc*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number family tcc]
protocols [inet iso mpls];
```



**NOTE:** Layer 2.5 VPNs running on M Series Multiservice Edge Routers support only IPv4 traffic. IPv6 is not supported on Layer 2.5 VPNs.

When enabling ISO over a Layer 2.5 VPN that is configured on a CE Ethernet interface, you must also include the **point-to-point** statement at the **[edit protocols isis interface *interface-name*]** hierarchy level:

```
[edit protocols isis interface interface-name]
point-to-point;
```

For more information about Layer 2.5 VPNs, see the *Junos OS VPNs Library for Routing Devices* and the *Translational Cross-Connect and Layer 2.5 VPNs Feature Guide*.

---

## Configuring ATM-to-Ethernet Interworking

- [ATM-to-Ethernet Interworking on page 254](#)
- [Enabling ATM-to-Ethernet Interworking on page 255](#)
- [Configuring the Ethernet Interface on page 255](#)
- [Configuring Ethernet Encapsulation on page 256](#)
- [Configuring the Outer VLAN Identifier on page 256](#)
- [Configuring the Inner VLAN Identifier Range on page 256](#)
- [Configuring the Physical Interface VPI on page 256](#)
- [Configuring the ATM Logical Interface on page 257](#)
- [Configuring the Protocol Family on page 257](#)
- [Configuring the Logical Interface VPI on page 257](#)
- [Configuring the Logical Interface VCI on page 258](#)

### ATM-to-Ethernet Interworking

The ATM-to-Ethernet interworking feature is useful where ATM2 interfaces are used to terminate ATM DSLAM traffic. The ATM traffic can be forwarded with encapsulation type **ccc** (circuit cross-connect) to a local or remote Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E interface or label-switched path (LSP). The ATM VPI and VCI are converted to stacked VLAN inner and outer VLAN tags.

These ATM-to-Ethernet interworking circuits can be mapped to individual logical interfaces configured on an ATM2 IQ interface and Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E physical interface.



The ATM-to-Ethernet interworking cross-connect essentially provides Layer 2 switching, and statistics are reported at the logical interface level.

During conversion from ATM to Ethernet, the least significant 12 bits of the ATM cell VCI are copied to the Ethernet frame inner VLAN tag. Cells received on an ATM logical interface configured with encapsulation type **vlan-vci-ccc** and falling within the configured VCI range are reassembled into packets and forwarded to a designated Ethernet logical interface that is configured with encapsulation type **vlan-vci-ccc**.

During conversion from Ethernet to ATM, the Ethernet frame inner VLAN tags that fall within the configured range, are copied to the least significant 12 bits of the ATM cell VCI. The ATM logical interface uses its configured VPI when segmenting the Ethernet packets into cells.

ATM-to-Ethernet interworking is supported on M120, M320, and T Series routers.

ATM-to-Ethernet interworking is supported on MX Series routers with aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces. This feature is available on all Enhanced Queuing (EQ) DPCs and Enhanced DPCS for MX Series routers.



**NOTE:** This feature is *not* supported on MX Series routers with ATM interfaces.

For more information on MX Series ATM-to-Ethernet interworking, see the *MX Series Solutions Guide*.

The following sections discuss ATM-to-Ethernet interworking:

## Enabling ATM-to-Ethernet Interworking

To enable the ATM-to-Ethernet interworking cross-connect function, include the **vlan-vci-tagging** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
vlan-vci-tagging;
```

## Configuring the Ethernet Interface

Configure the Ethernet or aggregated Ethernet physical interface by including the **encapsulation** statement with the **vlan-vci-ccc** option at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
encapsulation vlan-vci-ccc;
```

When the encapsulation type **vlan-vci-ccc** is configured on the physical interface, all logical interfaces configured on the Ethernet interface must also have the encapsulation type set to **vlan-vci-ccc**.

## Configuring Ethernet Encapsulation

Configure the Ethernet logical interface by including the **encapsulation** statement with the **vlan-vci-ccc** option at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
encapsulation vlan-vci-ccc;
```

The chassis configuration cannot contain the **atm-l2circuit-mode** statement if any logical interfaces are configured with the **vlan-vci-ccc** encapsulation option.

## Configuring the Outer VLAN Identifier

Configure the Ethernet logical interface outer VLAN ID by including the **vlan-id** statement specifying the outer VLAN ID at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
vlan-id outer-vlan-identifier;
```

It is the administrator's responsibility to ensure that the outer VLAN tag and VPI match and the inner VLAN tags fall within the VCI range of the VPI.

The allowable VPI range is from 0 to 255. So the outer VLAN tags must not be configured for values above 255.

## Configuring the Inner VLAN Identifier Range

Configure the Ethernet logical interface inner VLAN ID range by including the **inner-vlan-id-range** statement and specifying the starting VLAN ID and ending VLAN ID at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
inner-vlan-id-range start start-id end end-id;
```

VLAN IDs 0 and 4095 are reserved by IEEE 801.1q and must not be used for the inner or outer VLAN ID.

VCIs 0 through 31 are reserved for ATM management purposes by convention. Therefore inner VLAN IDs 1 through 31 should not be used.

VLAN ID 1 might be used by Ethernet switches for certain bridge management services, so using VLAN ID 1 for the inner or outer VLAN ID is discouraged.

## Configuring the Physical Interface VPI

Configure the ATM physical interface VPI by including the **vpi** statement at the **[edit interfaces *interface-name* atm-options]** hierarchy level:

```
[edit interfaces interface-name atm-options]
vpi virtual-path-identifier;
```

VPI 0 is reserved, and must not be used.

ATM F4/F5 OAM is not supported for VPIs used in ATM-to-Ethernet interworking cross-connects. Any F4/F5 OAM cells received are discarded.

Only one logical interface may be declared per virtual path specified in the **atm-options** statement hierarchy.

It is not necessary to dedicate all the VPIs of an ATM2 interface for ATM-to-Ethernet interworking cross-connects.

## Configuring the ATM Logical Interface

Configure the ATM logical interface by including the **encapsulation** statement and specifying the encapsulation type **vlan-vci-ccc** at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
encapsulation vlan-vci-ccc;
```

An ATM logical interface configured with the encapsulation type **vlan-vci-ccc** only supports the **epd-threshold**, **shaping**, **traps | no-traps**, **disable**, and **description** statements. No other configuration statements are supported. ATM interface CoS features are not supported by logical interfaces configured with the encapsulation type **vlan-vci-ccc**.

The ATM2 OC48 PIC does not support the encapsulation type **vlan-vci-ccc**.

The encapsulation type **vlan-vci-ccc** only supports the **ccc** protocol family. Attempts to configure any other interface protocol family are rejected.

## Configuring the Protocol Family

Configure the ATM logical interface protocol family by including the **family** statement and specifying the **ccc** option at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
family ccc;
```

## Configuring the Logical Interface VPI

Configure the ATM logical interface virtual path identifier by including the **vpi** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]
vpi virtual-path-identifier;
```

VPI 0 is reserved, and must not be used.

It is the administrator's responsibility to ensure the outer VLAN tag and VPI match and the inner VLAN tags fall within the VCI range of the VPI.

Once a VPI is used in an ATM-to-Ethernet interworking cross-connect, it cannot be used with any other logical interface, even if the **vpi.vci** value falls outside the VCI range for the cross-connect.

## Configuring the Logical Interface VCI

Configure the ATM logical interface virtual channel identifier range by including the **vci-range** statement and specifying the starting VCI and ending VCI at the **[edit interfaces interface-name unit logical-unit-number]** hierarchy level:

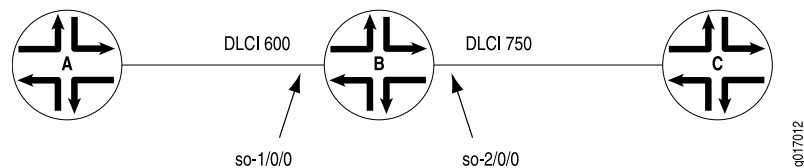
```
[edit interfaces interface-name unit logical-unit-number]
vci-range start start-vci end end-vci;
```

Do not use VCIs 0 through 31, which are reserved for ATM management purposes by convention.

## Example: Configuring a CCC over Frame Relay Encapsulated Interface

Configure a full-duplex Layer 2 switching circuit cross-connect between Router A and Router C, using a Juniper Networks router, Router B, as the virtual switch. See the topology in Figure 17 on page 258.

**Figure 17: Example Topology of a Switching Circuit Cross-Connect with Frame Relay CCC Encapsulation**



```
[edit]
interfaces {
 so-1/0/0 {
 encapsulation frame-relay-ccc;
 unit 1 {
 point-to-point;
 eui-64 frame-relay-ccc;
 dlci 600;
 }
 }
 so-2/0/0 {
 encapsulation frame-relay-ccc;
 unit 2 {
 point-to-point;
 encapsulation frame-relay-ccc;
 dlci 750;
 }
 }
}
protocols {
 connections {
 interface-switch router-a-router-c {
 interface so-1/0/0.1;
 interface so-2/0/0.2;
 }
 }
}
mpls {
```

```

 interface all;
 }
}

```

**Related Documentation**

- *Configuring Layer 2 Switching Cross-Connects Using CCC*

## Example: Configuring a TCC

Configure a full-duplex switching translational cross-connect with PPP TCC encapsulation between Router A and Router C, using a Juniper Networks router, Router B, as the virtual switch. See the topology in [Figure 18 on page 259](#).

In this topology, Router B has a PPP connection to Router A and an ATM connection to Router C.

**Figure 18: Layer 2.5 Switching Translational Cross-Connect**



**On Router A**

```

[edit]
interfaces {
 so-0/1/0 {
 description "to Router B so-1/0/0";
 encapsulation ppp;
 unit 0 {
 family inet {
 address 10.1.1.1/30;
 }
 }
 }
}

```

**On Router B**

```

[edit]
interfaces {
 so-1/0/0 {
 description "to Router A so-0/1/0";
 encapsulation ppp-tcc;
 unit 0 {
 }
 }
 at-1/1/0 {
 description "to Router C at-0/3/0";
 atm-options {
 vpi 0 maximum-vcs 2000;
 }
 unit 32 {
 vci 32;
 encapsulation atm-tcc-vc-mux;
 }
 }
}

```

```
[edit]
protocols {
 mpls {
 interface so-1/0/0.0;
 interface at-1/1/0.32;
 }
 connections {
 interface-switch PPP-to-ATM {
 interface so-1/0/0.0;
 interface at-1/1/0.32;
 }
 }
}
```

On Router C

```
[edit]
interfaces {
 at-0/3/0 {
 description "to Router B at-1/1/0";
 atm-options {
 vpi 0 maximum-vc 2000;
 }
 unit 32 {
 vci 32;
 encapsulation atm-vc-mux;
 family inet {
 address 10.1.1.2/30;
 }
 }
 }
}
```

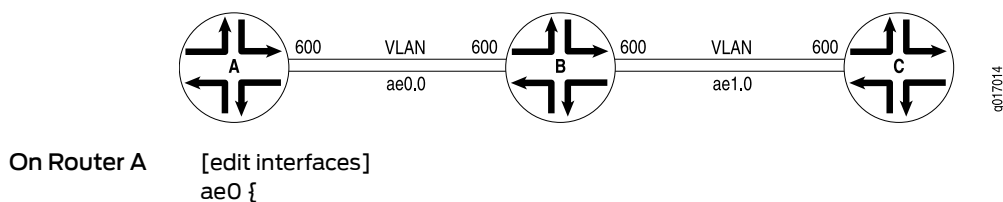
**Related Documentation**

- [Circuit and Translational Cross-Connects Overview on page 247](#)

## Example: Configuring CCC over Aggregated Ethernet

See the topology in [Figure 19 on page 260](#). In this topology, CE Routers A and C have aggregated Ethernet connections to PE Router B. With CCC, you specify that the circuit from Router A is connected to the circuit from Router C. Router B functions as a cross-connect switch between the two circuits. For a back-to-back connection, all VLAN IDs must be the same on Router A through Router C. You configure Router A and Router C as standard aggregated Ethernet interfaces. For more information about aggregated Ethernet, see *Aggregated Ethernet Interfaces Overview*.

**Figure 19: Interface-to-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces**



```

vlan-tagging;
aggregated-ether-options {
 minimum-links 1;
 link-speed 1g;
}
unit 0 {
 vlan-id 600;
 family inet {
 address 192.168.1.1/30;
 }
}
}

```

**On Router B**

```

[edit interfaces]
ae0 {
 encapsulation vlan-ccc;
 vlan-tagging;
 aggregated-ether-options {
 minimum-links 1;
 link-speed 1g;
 }
 unit 0 { # CCC switch
 encapsulation vlan-ccc;
 vlan-id 600;
 family ccc;
 }
}
ae1 {
 encapsulation vlan-ccc;
 vlan-tagging;
 aggregated-ether-options {
 minimum-links 1;
 link-speed 100m;
 }
 unit 0 {
 encapsulation vlan-ccc;
 vlan-id 600;
 family ccc;
 }
}
[edit protocols]
mpls {
 interface all;
}
connections {
 interface-switch layer2-cross-connect {
 interface ae0.0;
 interface ae1.0;
 }
}

```

**On Router C**

```

[edit interfaces]
ae1 {
 vlan-tagging;
 aggregated-ether-options {
 minimum-links 1;
 }
}

```

```

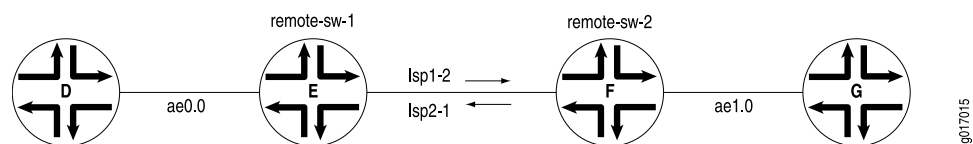
 link-speed 1g;
 }
 unit 0 {
 vlan-id 600;
 family inet {
 address 192.168.1.2/30;
 }
 }
}

```

## Example: Configuring a Remote LSP CCC over Aggregated Ethernet

See the topology in [Figure 20 on page 262](#). In this topology, CE Router G has an aggregated Ethernet connection to PE Router F. CE Router D has an aggregated Ethernet connection to PE Router E. Router E and Router F have an MPLS LSP between them. With remote CCC, you specify that the circuit from Router D is connected to the circuit from Router G. The circuit from Router D is connected to the LSP on Router E; the circuit from Router G is connected to the LSP on Router F. In other words, **ae0.0** and **ae1.0** are connected using **lsp1-2** and **lsp2-1**. You configure Router D and Router G as standard aggregated Ethernet interfaces. For more information about aggregated Ethernet, see *Aggregated Ethernet Interfaces Overview*.

**Figure 20: Remote Interface-LSP-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces**



**On Router D**

```

[edit interface]
ae0 {
 aggregated-ether-options {
 minimum-links 1;
 link-speed 1g;
 lacp {
 active;
 periodic fast;
 }
 }
 unit 0 {
 family inet {
 address 192.168.2.1/30;
 }
 }
}

```

**On Router E**

```

[edit interfaces]
ae0 {
 encapsulation ethernet-ccc;
 aggregated-ether-options {
 minimum-links 1;
 link-speed 100m;
 }
}

```



```

 lACP {
 active;
 periodic fast;
 }
 }
 unit 0 {
 encapsulation vlan-ccc; # default
 family ccc; # default
 }
}
[edit protocols]
mpls {
 interface all;
}
connections {
 remote-interface-switch remote-sw-1 {
 interface ae0.0;
 receive-lsp lsp2_1;
 transmit-lsp lsp1_2;
 }
}

```

**On Router F**

```

[edit interfaces]
ae1 {
 encapsulation ethernet-ccc;
 aggregated-ether-options {
 minimum-links 1;
 link-speed 100m;
 lACP {
 active;
 periodic fast;
 }
 }
 unit 0 {
 encapsulation vlan-ccc; # default
 family ccc; # default
 }
}
[edit protocols]
mpls {
 interface all;
}
connections {
 remote-interface-switch remote-sw-2 {
 interface ae1.0;
 receive-lsp lsp1_2;
 transmit-lsp lsp2_1;
 }
}

```

**On Router G**

```

[edit interface]
ae1 {
 aggregated-ether-options {
 minimum-links 1;
 link-speed 1g;
 }
}

```

```

 lacp {
 active;
 periodic fast;
 }
}
unit 0 {
 family inet {
 address 192.168.2.2/30;
 }
}
}

```

## Example: Configuring ATM-to-Ethernet Interworking

The following example shows the configuration of the ATM and Ethernet interfaces for an ATM-to-Ethernet interworking cross connect. In the example ATM DSLAM traffic is terminated on an ATM2 interface. The ATM traffic is forwarded using encapsulation type **vlan-vci-ccc** to a local Ethernet IQ2 and IQ2-E interface. See the topology in [Figure 21 on page 264](#).

Figure 21: ATM-to-Ethernet Interworking



In this example, the ATM traffic comes from the DSLAM to the router on ATM interface **at-4/0/0** and is forwarded out on Ethernet interface **ge-2/2/1**.

```

[edit interfaces]
ge-2/2/1 {
 vlan-vci-tagging;
 encapsulation vlan-vci-ccc;
 unit 0 {
 encapsulation vlan-vci-ccc;
 vlan-id 100;
 inner-vlan-id-range start 100 end 500;
 }
}
at-4/0/0 {
 atm-options {
 vpi 100;
 }
 unit 0 {
 encapsulation vlan-vci-ccc;
 family ccc;
 vpi 100;
 vci-range start 100 end 500;
 }
}

```

**Related Documentation**

- [Configuring ATM-to-Ethernet Interworking on page 254](#)



## PART 2

# Special Router Interfaces

- [Configuring Discard Interfaces on page 269](#)
- [Configuring IP Demultiplexing Interfaces on page 273](#)
- [Configuring the Loopback Interface on page 287](#)



## CHAPTER 6

# Configuring Discard Interfaces

- [Discard Interfaces Overview on page 269](#)
- [Configuring Discard Interfaces on page 270](#)

### Discard Interfaces Overview

---

The discard interface *dsc* is not a physical interface, but a virtual interface that discards packets.

The following sections explain discard interfaces in detail:

- [Understanding Discard Interfaces on page 269](#)
- [Guidelines to Follow When Configuring a Discard Interface on page 269](#)

### Understanding Discard Interfaces

The discard interface allows you to identify the ingress point of a denial-of-service (DoS) attack. When your network is under attack, the target host IP address is identified, and the local policy forwards attacking packets to the discard interface. When traffic is routed out of the discard interface, the traffic is silently discarded.

The discard interface allows you to protect a network from DoS attacks by identifying the target IP address that is being attacked and configuring a policy to forward all packets to a discard interface. All packets forwarded to the discard interface are dropped. See *Example: Forwarding Packets to the Discard Interface*.

You can configure the **inet** family protocol on the discard interface, which allows you to apply an output filter to the interface. If you apply an output filter to the interface, the action specified by the filter is executed before the traffic is discarded.

Once you configure a discard interface, you must then configure a local policy to forward attacking traffic to the discard interface.

### Guidelines to Follow When Configuring a Discard Interface

Keep the following guidelines in mind when configuring the discard interface:

- Only the logical interface unit 0 is supported.
- The **filter** and **address** statements are optional.

- Although you can configure an input filter and a filter group, these configuration statements have no effect because traffic is not transmitted from the discard interface.
- The discard interface does not support class of service (CoS).

**Related  
Documentation**

- [Configuring Discard Interfaces on page 270](#)
- *Example: Forwarding Packets to the Discard Interface*

---

## Configuring Discard Interfaces

The discard (dsc) interface is not a physical interface, but a virtual interface that discards packets. You can configure one discard interface. This interface allows you to identify the ingress point of a denial-of-service (DoS) attack. When your network is under attack, the target host IP address is identified, and the local policy forwards attacking packets to the discard interface. Traffic routed out of the discard interface is silently discarded.

The following sections explain how to forward packets to a discard interface by configuring a discard interface with an input filter and an output filter along with an input policy to associate a community with the discard interface and an output policy to set up the community on the routes injected into the network:

- [Configure a Discard Interface on page 270](#)
- [Configure an Input Policy on page 271](#)
- [Configure an Output Policy on page 271](#)

### Configure a Discard Interface

To configure a discard interface:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level.

```
[edit]
user@host# edit interfaces
```

2. Configure the discard interface.

```
[edit interfaces]
user@host# edit dsc
```

3. Configure the logical interface and the protocol family.

```
[edit interfaces dsc]
user@host# edit unit 0 family family
```

4. Configure an input filter to be applied to received packets.

```
[edit interfaces dsc unit 0 family family]
user@host# set filter input filter-name
```

5. Configure an output filter to be applied to transmitted packets.

```
[edit interfaces dsc unit 0 family family]
user@host# set filter output filter-name
```

6. Configure the interface IP address and the remote address of the connection.



```
[edit interfaces dsc unit 0 family family]
user@host# set address ip-address destination ip-address
```

7. Commit the configuration and go to the top of the hierarchy level.

```
[edit interfaces dsc unit 0 family family]
user@host# commit
user@host# top
```

## Configure an Input Policy

You must configure an input policy to associate a community with the discard interface.

To configure an input policy to associate a community with the discard interface:

1. In configuration mode, go to the **[edit policy-options]** hierarchy level.

```
[edit]
user@host# edit policy-options
```

2. Configure the BGP community information option with a name and configure the number of community members as needed.

```
[edit policy-options]
user@host# set community community-name members community-id
```

3. Configure a routing policy.

```
[edit policy-options]
user@host# edit policy-statement statement-name
```

4. Configure a policy term with a name.

```
[edit policy-options policy-statement statement-name]
user@host# edit term term-variable
```

5. Configure the conditions to match the source of a route with the **from** statement with the BGP community members.

```
[edit policy-options policy-statement statement-name term term-variable]
user@host# set from community value
```

6. Configure the action that is to be taken when the if and to conditions match with the **then** statement. In this case, configure the next-hop address of the remote end of the point-to-point interface and accept the action.

```
[edit policy-options policy-statement statement-name term term-variable]
user@host# set then next-hop address
user@host# set then accept
```

7. Commit the configuration and go to the top of the hierarchy level.

```
[edit policy-options policy-statement statement-name term term-variable]
user@host# commit
user@host# top
```

## Configure an Output Policy

You must configure an output policy to set up the community on the routes injected into the network.

To configure an output policy.

1. In configuration mode, go to the **[edit policy-options]** hierarchy level.

```
[edit]
user@host# edit policy-options
```

2. Configure a routing policy.

```
[edit policy-options]
user@host# edit policy-statement statement-name
```

3. Configure a policy term with a name.

```
[edit policy-options policy-statement statement-name]
user@host# edit term term-variable
```

4. Configure the list of prefix-lists of routes to match with a name.

```
[edit policy-options policy-statement statement-name term term-variable]
user@host# set from prefix-list name
```

5. Configure the action that is to be taken when the if and to conditions match with the **then** statement. In this case, configure the BGP community properties (set, add, and delete) associated with a route.

```
[edit policy-options policy-statement statement-name term term-variable]
user@host# set then community (set | add | delete) community-name
```

6. Commit the configuration and go to the top of the hierarchy level.

```
[edit interfaces dsc unit 0 family family]
user@host# commit
user@host# top
```

**Related Documentation**

- [Discard Interfaces Overview on page 269](#)

## CHAPTER 7

# Configuring IP Demultiplexing Interfaces

- [Demultiplexing Interface Overview on page 273](#)
- [Configuring an IP Demultiplexing Interface on page 276](#)
- [Configuring a VLAN Demultiplexing Interface on page 280](#)

## Demultiplexing Interface Overview

---

Demultiplexing (demux) interfaces are logical interfaces that share a common, underlying interface. You can create logical subscriber interfaces using static or dynamic demultiplexing interfaces. In addition, you can use IP demultiplexing interfaces or VLAN demultiplexing interfaces when creating logical subscriber interfaces.

Demux interfaces are supported on M120 or MX Series routers only.

Demux interfaces support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.



**NOTE:** You can also configure demux interfaces dynamically. For information about how to configure dynamic IP demux or dynamic VLAN demux interfaces, see *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles* or *Configuring Dynamic Subscriber Interfaces Using VLAN Demux Interfaces in Dynamic Profiles*.

To configure static demux interfaces, see “[Configuring a VLAN Demultiplexing Interface](#)” on page 280 and “[Configuring an IP Demultiplexing Interface](#)” on page 276.

- [IP Demux Interface Overview on page 273](#)
- [VLAN Demux Interface Overview on page 274](#)
- [Guidelines to Remember When Configuring A Demux Interface on page 274](#)
- [MAC Address Validation on Static Demux Interfaces on page 275](#)

## IP Demux Interface Overview

IP demux interfaces use the IP source address or IP destination address to demultiplex received packets when the subscriber is not uniquely identified by a Layer 2 circuit.

To determine which IP demux interface to use, the destination or source prefix is matched against the destination or source address of packets that the underlying interface receives. The underlying interface family type must match the demux interface prefix type.

## VLAN Demux Interface Overview

VLAN demux interfaces use the VLAN ID to demultiplex received packets when the subscriber is not uniquely identified. A VLAN demux interface uses an underlying logical interface to receive packets.

To determine which VLAN demux interface to use, the VLAN ID is matched against that which the underlying interface receives.



**NOTE:** VLAN demux subscriber interfaces over aggregated Ethernet physical interfaces are supported only for MX Series routers that have only Trio MPCs installed. If the router has other MPCs in addition to Trio MPCs, the CLI accepts the configuration but errors are reported when the subscriber interfaces are brought up.

## Guidelines to Remember When Configuring A Demux Interface

Keep the following guidelines in mind when configuring the demux interface:

- Demux interfaces are supported on M120 or MX Series routers only.
- You can configure only one **demux0** interface per chassis, but you can define logical demux interfaces on top of it (for example, **demux0.1**, **demux0.2**, and so on).
- If the address in a received packet does not match any demux prefix, the packet is logically received on the underlying interface. For this reason, the underlying interface is often referred to as the *primary* interface.
- [Points to Remember When Configuring an IP Demux Interface on page 274](#)
- [Points to Remember When Configuring a VLAN Demux Interface on page 275](#)

### Points to Remember When Configuring an IP Demux Interface

---

In addition to the guidelines in “[Guidelines to Remember When Configuring A Demux Interface](#)” on page 274, the following guidelines are to be noted when configuring an IP demux interface:

- You must associate demux interfaces with an underlying logical interface.



**NOTE:** IP demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

- The demux underlying interface must reside on the same logical system as the demux interfaces that you configure over it.

- IP demux interfaces currently supports the Internet Protocol version 4 (IPv4) suite inet and Internet Protocol version 6 (IPv6) suite inet6 family types.
- You can configure more than one demux prefix for a given demux unit. However, you cannot configure the exact same demux prefix on two different demux units with the same underlying interface.
- You can configure overlapping demux prefixes on two different demux units with the same underlying prefix. However, under this configuration, best match rules apply (in other words, the most specific prefix wins).

### Points to Remember When Configuring a VLAN Demux Interface

In addition to the guidelines in “[Guidelines to Remember When Configuring A Demux Interface](#)” on page 274, the following guidelines are to be noted when configuring a VLAN demux interface:

- You must associate VLAN demux interfaces with an underlying logical interface.



**NOTE:** VLAN demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

- The demux underlying interface must reside on the same logical system as the demux interfaces that you configure over it.
- VLAN demux interfaces currently supports the Internet Protocol version 4 (IPv4) suite inet and Internet Protocol version 6 (IPv6) suite inet6 family types.

### MAC Address Validation on Static Demux Interfaces

MAC address validation enables the router to validate that received packets contain a trusted IP source and an Ethernet MAC source address.

MAC address validation is supported on static demux interfaces on MX Series routers only.

There are two types of MAC address validation that you can configure:

- [Loose on page 275](#)
- [Strict on page 276](#)

#### Loose

Forwards packets when both the IP source address and the MAC source address match one of the trusted address tuples.

Drops packets when the IP source address matches one of the trusted tuples, but the MAC address does not support the MAC address of the tuple

Continues to forward packets when the source address of the incoming packet does not match any of the trusted IP addresses.

### Strict

---

Forwards packets when both the IP source address and the MAC source address match one of the trusted address tuples.

Drops packets when the MAC address does not match the tuple's MAC source address, or when IP source address of the incoming packet does not match any of the trusted IP addresses.

#### Related Documentation

- [Associating VLAN IDs to VLAN Demux Interfaces](#)
- [Binding VLAN IDs to Logical Interfaces](#)
- [Configuring an IP Demultiplexing Interface on page 276](#)
- [Configuring a VLAN Demultiplexing Interface on page 280](#)
- [Subscriber Interfaces and Demultiplexing Overview](#)

## Configuring an IP Demultiplexing Interface

---

Demultiplexing (demux) interfaces are logical interfaces that share a common, underlying interface. You can configure IP demultiplexing interfaces or VLAN demultiplexing interfaces.

To configure an IP demux interface, you must configure the demux prefixes that are used by the underlying interface and then configure the IP demultiplexing interface as explained in the following tasks:

1. [Configuring an IP Demux Underlying Interface on page 276](#)
2. [Configuring the IP Demux Interface on page 277](#)
3. [Configuring MAC Address Validation on Static IP Demux Interfaces on page 279](#)

### Configuring an IP Demux Underlying Interface

An IP demux interface uses an underlying logical interface to receive packets. To determine which IP demux interface to use, the destination or source prefix is matched against the destination or source address of packets that the underlying interface receives. The underlying interface family type must match the demux interface prefix type.



**NOTE:** IP demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

To configure a logical interface as an IP demux underlying interface with demux source:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as fe-x/y/z and the logical interface with the **unit** statement. Note that IP demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

```
[edit interfaces]
user@host# edit fe-x/y/z unit logical-unit-number unit logical-unit-number
```

3. Configure the logical demux source family type on the IP demux underlying interface as inet or inet6.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# set demux-source (inet | inet6)
```

4. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# commit
user@host# top
```

To configure a logical interface as an IP demux underlying interface with demux destination:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as fe-x/y/z and the logical interface with the **unit** statement. Note that IP demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

```
[edit interfaces]
user@host# edit fe-x/y/z unit logical-unit-number unit logical-unit-number
```

3. Configure the logical demux destination family type on the IP demux underlying interface as inet or inet6.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# set demux-destination (inet | inet6)
```

4. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# commit
user@host# top
```

## Configuring the IP Demux Interface

You can configure one or more logical demux source prefixes or destination prefixes after specifying an underlying interface for the static demux interface to use. This underlying interface must reside on the same logical system as the demux interface.

You configure demux prefixes for use by the underlying interface. The demux prefixes can represent individual hosts or networks. For a given demux interface unit, you can configure either demux source or demux destination prefixes but not both.

You can choose not to configure a demux source or demux destination prefix. This type of configuration results in a transmit-only interface.

To configure the IP demux interface with source prefix:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as a logical demux interface (for example, demux0 interface) and configure the logical interface with the **unit** statement.



**NOTE:** You can configure only one demux0 interface per chassis, but you can define logical demux interfaces on top of it (for example, demux0.1, demux0.2, and so on).

```
[edit interfaces]
user@host# edit demux0 unit logical-unit-number
```

3. Configure the underlying interface on which the demux interface is running under the **demux-options** statement.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# set demux-options underlying-interface interface-name
```

4. Configure the protocol family.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

5. Configure one or more logical demux source prefixes (IP address). The prefixes are matched against the source address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set demux-source source-prefix
```

6. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# commit
user@host# top
```

To configure the IP demux interface with destination prefix:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as a logical demux interface (for example, demux0 interface) and configure the logical interface with the **unit** statement.



**NOTE:** You can configure only one demux0 interface per chassis, but you can define logical demux interfaces on top of it (for example, demux0.1, demux0.2, and so on).



```
[edit interfaces]
user@host# edit demux0 unit logical-unit-number
```

3. Configure the underlying interface on which the demux interface is running under the **demux-options** statement.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# set demux-options underlying-interface interface-name
```

4. Configure the protocol family.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

5. Configure one or more logical demux destination prefixes. The prefixes are matched against the destination address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set demux-destination destination-prefix
```

6. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# commit
user@host# top
```

## Configuring MAC Address Validation on Static IP Demux Interfaces

MAC address validation enables the router to validate that received packets contain a trusted IP source and an Ethernet MAC source address.

To configure MAC address validation for an IP demux interface:

1. In configuration mode, go to the **[edit interfaces demux0 unit *logical-unit-number*]** hierarchy level:

```
[edit]
user@host# edit interfaces demux0 unit logical-unit-number
```

2. Configure the protocol family for the interface.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

3. Configure the **mac-validate** statement to validate source MAC address with loose or strict options.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set mac-validate (loose | strict)
```

4. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# commit
user@host# top
```

- Related Documentation**
- [Configuring a VLAN Demultiplexing Interface on page 280](#)
  - [Demultiplexing Interface Overview on page 273](#)

## Configuring a VLAN Demultiplexing Interface

---

Demultiplexing (demux) interfaces are logical interfaces that share a common, underlying interface. You can configure IP demultiplexing interfaces or VLAN demultiplexing interfaces.

To configure a VLAN demux interface, you must configure the demux prefixes that are used by the underlying interface and then configure the VLAN demultiplexing interface as explained by the following tasks:

1. [Configuring a VLAN Demux Underlying Interface on page 280](#)
2. [Configuring the VLAN Demux Interface on page 281](#)
3. [Configuring MAC Address Validation on Static VLAN Demux Interfaces on page 283](#)
4. [Verifying a Demux Interface Configuration on page 284](#)

## Configuring a VLAN Demux Underlying Interface

A VLAN demux interface uses an underlying logical interface to receive packets. To determine which VLAN demux interface to use, the VLAN ID is matched against that which the underlying interface receives.



**NOTE:** VLAN demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

VLAN demux subscriber interfaces over aggregated Ethernet physical interfaces are supported only for MX Series routers that have only Trio MPCs installed. If the router has other MPCs in addition to Trio MPCs, the CLI accepts the configuration but errors are reported when the subscriber interfaces are brought up

To configure a logical interface as a VLAN demux underlying interface with demux source:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:  

```
[edit]
user@host# edit interfaces
```
2. Configure the interface as fe-x/y/z and the logical interface with the **unit** option.  

```
[edit interfaces]
user@host# edit fe-x/y/z unit logical-unit-number unit logical-unit-number
```
3. Configure the VLAN ID. The VLAN ID is used to determine which VLAN demux interface to use, that is the VLAN ID is matched against that which the underlying interface receives.  

```
[edit interfaces fe-x/y/z unit logical-unit-number]
```

```
user@host# set vlan-id number
```

4. Configure the logical demux source family type on the VLAN demux underlying interface as `inet` or `inet6`.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# set demux-source (inet | inet6)
```

5. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# commit
user@host# top
```

To configure a logical interface as a VLAN demux underlying interface with demux destination:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as `fe-x/y/z` and the logical interface with the `unit` option.

```
[edit interfaces]
user@host# edit fe-x/y/z unit logical-unit-number unit logical-unit-number
```

3. Configure the VLAN ID. The VLAN ID is used to determine which VLAN demux interface to use, that is the VLAN ID is matched against that which the underlying interface receives.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# set vlan-id number
```

4. Configure the logical demux destination family type on the VLAN demux underlying interface as `inet` or `inet6`.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# set demux-destination (inet | inet6)
```

5. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces fe-x/y/z unit logical-unit-number]
user@host# commit
user@host# top
```

## Configuring the VLAN Demux Interface

You can configure one or more logical demux source prefixes or destination prefixes after specifying an underlying interface for the static demux interface to use. This underlying interface must reside on the same logical system as the demux interface.

You configure demux prefixes for use by the underlying interface. The demux prefixes can represent individual hosts or networks. For a given demux interface unit, you can configure either demux source prefix or demux destination prefixes but not both.

You can choose not to configure a demux source prefix or a demux destination prefix. This type of configuration results in a transmit-only interface

To configure VLAN demux interface with demux source prefix:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as a logical demux interface (for example, demux0 interface) and configure the logical interface with the **unit** statement.



**NOTE:** You can configure only one demux0 interface per chassis, but you can define logical demux interfaces on top of it (for example, demux0.1, demux0.2, and so on).

```
[edit interfaces]
user@host# edit demux0 unit logical-unit-number
```

3. Configure the underlying interface on which the demux interface is running under the **demux-options** statement.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# set demux-options underlying-interface interface-name
```

4. Configure the protocol family for the interface.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

5. Configure one or more logical demux source prefixes. The prefixes are matched against the source address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set demux-source source-prefix
```

6. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# commit
user@host# top
```

To configure VLAN demux interface with demux destination prefix:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the interface as a logical demux interface (for example, demux0 interface) and configure the logical interface with the **unit** statement.



**NOTE:** You can configure only one demux0 interface per chassis, but you can define logical demux interfaces on top of it (for example, demux0.1, demux0.2, and so on).

```
[edit interfaces]
```

```
user@host# edit demux0 unit logical-unit-number
```

3. Configure the underlying interface on which the demux interface is running under the **demux-options** statement.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# set demux-options underlying-interface interface-name
```

4. Configure the protocol family for the interface.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

5. Configure one or more logical demux destination prefixes. The prefixes are matched against the destination address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set demux-destination destination-prefix
```

6. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# commit
user@host# top
```

## Configuring MAC Address Validation on Static VLAN Demux Interfaces

MAC address validation enables the router to validate that received packets contain a trusted IP source and an Ethernet MAC source address.

To configure MAC address validation for a VLAN demux interface:

1. In configuration mode, go to the **[edit interfaces demux0 unit *logical-unit-number*]** hierarchy level:

```
[edit]
user@host# edit interfaces demux0 unit logical-unit-number
```

2. Configure the protocol family for the interface.

```
[edit interfaces demux0 unit logical-unit-number]
user@host# edit family family
```

3. Configure the **mac-validate** statement to validate source MAC address with loose or strict options.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# set mac-validate (loose | strict)
```

4. Save the configuration and move to top of the hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number family family]
user@host# commit
user@host# top
```

## Verifying a Demux Interface Configuration

**Purpose** Check the configuration of a demux interface and its underlying interface when the following are configured:

- Two VLANs are configured, where each VLAN consists of two IP demux interfaces.
- One VLAN demultiplexes based on the source address
- The other VLAN demultiplexes based on the destination address.

**Action** From configuration mode on the MX Series router, run the **show interfaces fe-0/0/0** and **show interfaces demux0** configuration mode commands.

```
user@host> show interfaces fe-0/0/0
```

```
vlan-tagging;
unit 100 {
 vlan-id 100;
 demux-source inet; # Enable demux of inet prefixes
 family inet {
 address 10.1.1.1/24;
 filter {
 input vlan1-primary-in-filter;
 output vlan1-primary-out-filter;
 }
 mac-validate loose;
 }
}
unit 200 {
 vlan-id 200;
 demux-destination inet; # Enable demux of inet using destination addresses
 family inet {
 address 20.1.1.1/24;
 }
}
unit 300 {
 vlan-id 300;
 demux-source inet; # Enable demux of inet using source addresses
 family inet {
 address 20.1.2.1/24;
 }
}
```

```
user@host> show interfaces demux0
```

```
unit 101 {
 description vlan1-sub1;
 demux-options {
 underlying-interface fe-0/0/0.100;
 }
 family inet {
 demux-source 10.1.1.0/24;
 filter {
 input vlan1-sub1-in-filter;
 output vlan1-sub1-out-filter;
 }
 mac-validate loose;
 }
}
```

```
}
unit 102 {
 description vlan1-sub2;
 demux-options {
 underlying-interface fe-0/0/0.100;
 }
 family inet {
 demux-source {
 10.1.0.0/16;
 10.2.1.0/24;
 }
 filter {
 input vlan1-sub2-in-filter;
 output vlan1-sub2-out-filter;
 }
 mac-validate loose;
 }
}
unit 202 {
 description vlan2-sub2;
 demux-options {
 underlying-interface fe-0/0/0.200;
 }
 family inet {
 demux-destination 100.1.2.0/24;
 }
}
unit 302 {
 description vlan2-sub2;
 demux-options {
 underlying-interface fe-0/0/0.300;
 }
 family inet {
 demux-source 100.1.2.0/24;
 }
}
```

- Related Documentation**
- [Configuring an IP Demultiplexing Interface on page 276](#)
  - [Demultiplexing Interface Overview on page 273](#)





## CHAPTER 8

# Configuring the Loopback Interface

- [Configuring the Loopback Interface on page 287](#)

## Configuring the Loopback Interface

---

- [Configuring the Loopback Interface on page 287](#)
- [Example: Configuring Two Addresses on the Loopback Interface with Host Routes on page 288](#)
- [Example: Configuring Two Addresses on the Loopback Interface with Subnetwork Routes on page 289](#)
- [Example: Configuring an IPv4 and an IPv6 Address on the Loopback Interface with Subnetwork Routes on page 289](#)

## Configuring the Loopback Interface

When specifying the loopback address, do not include a destination prefix. Also, in most cases, do not specify a loopback address on any unit other than unit 0.



**NOTE:** For Layer 3 virtual private networks (VPNs), you can configure multiple logical units for the loopback interface. This allows you to configure a logical loopback interface for each virtual routing and forwarding (VRF) routing instance. For more information, see the *Junos OS VPNs Library for Routing Devices*.

For some applications, such as SSL for Junos XML protocol, the address for the interface `lo0.0` must be `127.0.0.1`.

You can configure loopback interfaces using a subnetwork address for both `inet` and `inet6` address families. Many protocols require a subnetwork address as their source address. Configuring a subnetwork loopback address as a donor interface enables these protocols to run on unnumbered interfaces.

If you configure the loopback interface, it is automatically used for unnumbered interfaces. If you do not configure the loopback interface, the router chooses the first interface to come online as the default. If you configure more than one address on the loopback interface, we recommend that you configure one to be the primary address to ensure

that it is selected for use with unnumbered interfaces. By default, the primary address is used as the source address when packets originate from the interface.

For more information about unnumbered interfaces, see [“Configuring an Unnumbered Interface” on page 195](#). For more information about primary addresses, see [“Configuring the Interface Address” on page 187](#).

On the router, you can configure one physical loopback interface, **lo0**, and one or more addresses on the interface.

1. To configure the physical loopback interface, include the following statements at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
lo0 {
 unit 0 {
 family inet {
 address loopback-address;
 address <loopback-address2>;
 ...
 }
 family inet6 {
 address loopback-address;
 }
 }
}
```

### Example: Configuring Two Addresses on the Loopback Interface with Host Routes

To configure two addresses on the loopback interface with host routes:

```
[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 172.16.0.1
[edit interfaces lo0 unit 0 family inet]
user@host# set address 10.0.0.1
[edit interfaces lo0 unit 0 family inet]
user@host# top
[edit]
user@host# show
interfaces {
 lo0 {
 unit 0 {
 family inet {
 10.0.0.1;
 127.0.0.1;
 172.16.0.1;
 }
 }
 }
}
```

### Example: Configuring Two Addresses on the Loopback Interface with Subnetwork Routes

To configure two addresses on the loopback interface with subnetwork routes:

```
[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 192.16.0.1/24
[edit interfaces lo0 unit 0 family inet]
user@host# set address 10.2.0.1/16
[edit interfaces lo0 unit 0 family inet]
user@host# top
[edit]
user@host# show
interfaces {
 lo0 {
 unit 0 {
 family inet {
 10.2.0.1/16;
 127.0.0.1/32;
 192.16.0.1/24;
 }
 }
 }
}
```

### Example: Configuring an IPv4 and an IPv6 Address on the Loopback Interface with Subnetwork Routes

To configure an IPv4 and an IPv6 address on the loopback interface with subnetwork routes:

```
[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 192.16.0.1/24
[edit interfaces lo0 unit 0 family inet]
user@host# up
[edit interfaces lo0 unit 0 family]
user@host# edit interfaces lo0 unit 0 family inet6
[edit interfaces lo0 unit 0 family inet6]
user@host# set address 3ffe::1:200:f8ff:fe75:50df/64
[edit interfaces lo0 unit 0 family inet6]
user@host# top
[edit]
user@host# show
interfaces {
 lo0 {
 unit 0 {
 family inet {
 127.0.0.1/32;
 192.16.0.1/24;
 }
 family inet6 {
```

```
 3ffe::1:200:f8ff:fe75:50df/64;
 }
}
}
```

**Related  
Documentation**

- *Junos OS VPNs Library for Routing Devices*
- [Configuring an Unnumbered Interface on page 195](#)
- [Configuring the Interface Address on page 187](#)

## PART 3

# Serial Interfaces

- [Serial Interfaces Overview on page 293](#)
- [Configuring Serial Interfaces on page 295](#)



## CHAPTER 9

# Serial Interfaces Overview

- [Serial Interfaces Overview on page 293](#)

### Serial Interfaces Overview

---

Devices that communicate over a serial interface are divided into two classes: data terminal equipment (DTE) and data circuit-terminating equipment (DCE). Juniper Networks Serial Physical Interface Cards (PICs) have two ports per PIC and support full-duplex data transmission. These PICs support DTE mode only. On the Serial PIC, you can configure three types of serial interfaces:

- EIA-530—An Electronics Industries Alliance (EIA) standard for the interconnection of DTE and DCE using serial binary data interchange with control information exchanged on separate control circuits.
- V.35—An ITU-T standard describing a synchronous, physical layer protocol used for communications between a network access device and a packet network. V.35 is most commonly used in the United States and in Europe.
- X.21—An ITU-T standard for serial communications over synchronous digital lines. The X.21 protocol is used primarily in Europe and Japan.

The following standards apply to serial interfaces:

- TIA/EIA Standard 530, *High-Speed 25-Position Interface for Data Terminal Equipment and Data Circuit-Terminating Equipment*, defines the signals on the cable and specifies the connector at the end of the cable.
- TIA/EIA Standard 232, *Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*, describes the physical interface and protocol for serial data communication.
- ITU-T Recommendation V.35, *Data Transmission at 48 kbit/s Using 60-108 kHz Group Band Circuits*. Note that the Juniper Networks Serial PIC supports V.35 interfaces with speeds higher than 48 kilobits per second.
- ITU-T Recommendation X.21, *Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment for Synchronous Operation on Public Data Networks*.

There are no serial interface-specific logical properties. For information about general logical properties that you can configure, see *Configuring Logical Interface Properties*. This

support on serial interfaces is the same as the existing LFI and MLPPP support on T1 and E1 interfaces.

**Related  
Documentation**

- [Example: Physical Interface Configuration Statements for Serial Interfaces on page 295](#)
- [Configuring the Serial Line Protocol on page 296](#)
- [Configuring the Serial Clocking Mode on page 300](#)
- [Configuring the Serial Signal Handling on page 302](#)
- [Configuring the Serial DTR Circuit on page 305](#)
- [Configuring Serial Signal Polarities on page 305](#)
- [Configuring Serial Loopback Capability on page 306](#)
- [Configuring Serial Line Encoding on page 308](#)



## CHAPTER 10

# Configuring Serial Interfaces

- [Example: Physical Interface Configuration Statements for Serial Interfaces on page 295](#)
- [Configuring the Serial Line Protocol on page 296](#)
- [Configuring the Serial Clocking Mode on page 300](#)
- [Configuring the Serial Signal Handling on page 302](#)
- [Configuring the Serial DTR Circuit on page 305](#)
- [Configuring Serial Signal Polarities on page 305](#)
- [Configuring Serial Loopback Capability on page 306](#)
- [Configuring Serial Line Encoding on page 308](#)

### Example: Physical Interface Configuration Statements for Serial Interfaces

---

To configure serial physical interface properties, include the **serial-options** statement at the **[edit interfaces se-*pim/0/port* ]** hierarchy level for J Series routers, or at the **[edit interfaces se-*fpc/pic/port*]** hierarchy level for M Series and T Series routers:

```
[edit interfaces se-fpc/pic/port]
serial-options {
 clock-rate rate;
 clocking-mode (dce | internal | loop);
 control-polarity (negative | positive);
 cts-polarity (negative | positive);
 dcd-polarity (negative | positive);
 dce-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
 }
 dsr-polarity (negative | positive);
 dte-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
```

```
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
dtr-circuit (negative | positive);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
idle-cycle-flag flag;
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
```

---

## Configuring the Serial Line Protocol

- [Configuring the Serial Line Protocol on page 296](#)
- [Serial Interface Default Settings on page 296](#)

### Configuring the Serial Line Protocol

By default, serial interfaces use the EIA-530 line protocol. You can configure each port on the PIC independently to use one of the following line protocols:

- EIA-530
- V.35
- X.21

To configure the serial line protocol:

1. Include the **line-protocol** statement, specifying the **eia530**, **v.35**, or **x.21** option:

```
 line-protocol protocol;
```

You can include these statements at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

For more information about serial interfaces, see the following sections:

### Serial Interface Default Settings

- [Serial Interface Default Settings on page 297](#)
- [Invalid Serial Interface Statements on page 298](#)

## Serial Interface Default Settings

- [EIA-530 Interface Default Settings on page 297](#)
- [V.35 Interface Default Settings on page 297](#)
- [X.21 Interface Default Settings on page 298](#)

### EIA-530 Interface Default Settings

If you do not include the **line-protocol** statement or if you explicitly configure the default EIA-530 line protocol, the default settings are as follows:

```
dce-options | dte-options {
 cts normal;
 dcd normal;
 dsr normal;
 dtr normal;
 rts normal;
 tm normal;
}
clock-rate 16.384mhz;
clocking-mode loop;
cts-polarity positive;
dcd-polarity positive;
dsr-polarity positive;
dtr-circuit balanced;
dtr-polarity positive;
encoding nrz;
rts-polarity positive;
tm-polarity positive;
```



**NOTE:** On M Series routers, you can set the DCE clocking mode for EIA-530 interfaces and commit. An error message is not displayed and the CLI is not blocked.

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

### V.35 Interface Default Settings

If you include the **line-protocol v.35** statement, the default settings are as follows:

```
dce-options | dte-options {
 cts normal;
 dcd normal;
 dsr normal;
 dtr normal;
 rts normal;
}
clock-rate 16.384mhz;
clocking-mode loop;
```

```
cts-polarity positive;
dcd-polarity positive;
dsr-polarity positive;
dtr-circuit balanced;
dtr-polarity positive;
encoding nrz;
rts-polarity positive;
```

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

### ***X.21 Interface Default Settings***

If you include the **line-protocol x.21** statement, the default settings are as follows:

```
dce-options | dte-options {
 control-signal normal;
 indication normal;
}
clock-rate 16.384mhz;
clocking-mode loop;
control-polarity positive;
encoding nrz;
indication-polarity positive;
```

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

---

### **Invalid Serial Interface Statements**

The following sections show the invalid configuration statements for each type of serial interface. If you include the following statements in the configuration, an error message indicates the location of the error and the configuration is not activated.

- [Invalid EIA-530 Interface Statements on page 298](#)
- [Invalid V.35 interface Statements on page 299](#)
- [Invalid X.21 Interface Statements on page 299](#)

### ***Invalid EIA-530 Interface Statements***

If you do not include the **line-protocol** statement or if you explicitly configure the default EIA-530 line protocol, the following statements are invalid:

```
dce-options | dte-options {
 control-signal (assert | de-assert | normal);
 indication (ignore | normal | require);
}
control-polarity (negative | positive);
indication-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

### ***Invalid V.35 Interface Statements***

If you include the **line-protocol v.35** statement, the following statements are invalid:

```
dce-options | dte-options {
 control-signal (assert | de-assert | normal);
 indication (ignore | normal | require);
 tm (ignore | normal | require);
}
control-polarity (negative | positive);
indication-polarity (negative | positive);
loopback (dce-local | dce-remote);
tm-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

### ***Invalid X.21 Interface Statements***

If you include the **line-protocol x.21** statement, the following statements are invalid:

```
dce-options | dte-options {
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr (assert | de-assert | normal);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
clocking-mode (dce | internal);
cts-polarity (negative | positive);
dce-polarity (negative | positive);
dsr-polarity (negative | positive);
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
loopback (dce-local | dce-remote);
rts-polarity (negative | positive);
tm-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

## Configuring the Serial Clocking Mode

- [Configuring the Serial Clocking Mode on page 300](#)
- [Inverting the Serial Interface Transmit Clock on page 301](#)
- [Configuring the DTE Clock Rate on page 301](#)

### Configuring the Serial Clocking Mode

By default, serial interfaces use loop clocking mode. For EIA-530 and V.35 interfaces, you can configure each port on the PIC independently to use loop, DCE, or internal clocking mode. For X.21 interfaces, only loop clocking mode is supported.

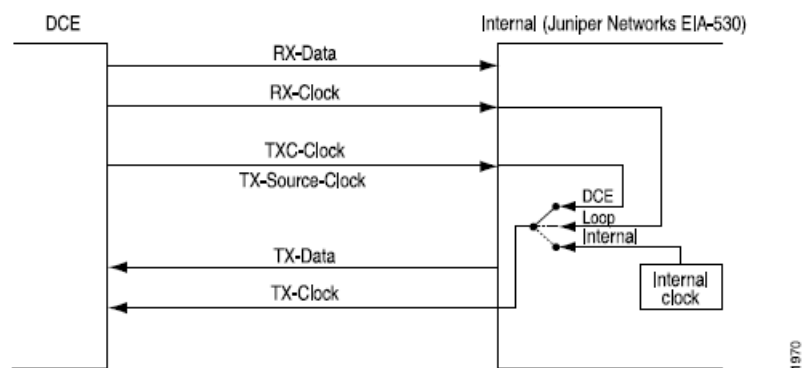
The three clocking modes work as follows:

- Loop clocking mode—Uses the DCE's RX clock to clock data from the DCE to the DTE.
- DCE clocking mode—Uses the TXC clock, which is generated by the DCE specifically to be used by the DTE as the DTE's transmit clock.
- Internal clocking mode—Also known as line timing, uses an internally generated clock. You can configure the speed of this clock by including the **clock-rate** statement at the **[edit interfaces se-pim/0/port serial-options]** or **[edit interfaces se-fpc/pic/port dte-options]** hierarchy levels. For more information about the DTE clock rate, see [“Configuring the DTE Clock Rate” on page 301](#).

Note that DCE clocking mode and loop clocking mode use external clocks generated by the DCE.

[Figure 22 on page 300](#) shows the clock sources of loop, DCE, and internal clocking modes.

Figure 22: Serial Interface Clocking Mode



To configure the clocking mode of a serial interface, include the **clocking-mode** statement:

```
clocking-mode (dce | internal | loop);
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**

- [edit interfaces *se-fpc/pic/port* serial-options]

## Inverting the Serial Interface Transmit Clock

When an externally timed clocking mode (DCE or loop) is used, long cables might introduce a phase shift of the DTE-transmitted clock and data. At high speeds, this phase shift might cause errors. Inverting the transmit clock corrects the phase shift, thereby reducing error rates.

By default, the transmit clock is not inverted. To invert the transmit clock, include the **transmit-clock invert** statement:

```
transmit-clock invert;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

## Configuring the DTE Clock Rate

By default, the serial interface has a clock rate of 16.384 MHz. For EIA-530 and V.35 interfaces with internal clocking mode configured, you can configure the clock rate.

To configure the clock rate, include the **clock-rate** statement:

```
clock-rate rate;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

You can configure the following interface speeds:

- 2.048 MHz
- 2.341 MHz
- 2.731 MHz
- 3.277 MHz
- 4.096 MHz
- 5.461 MHz
- 8.192 MHz
- 16.384 MHz

Although the serial interface is intended for use at the default rate of 16.384 MHz, you might need to use a slower rate if any of the following conditions prevail:

- The interconnecting cable is too long for effective operation.
- The interconnecting cable is exposed to an extraneous noise source that might cause an unwanted voltage in excess of +1 volt measured differentially between the signal conductor and circuit common at the load end of the cable, with a 50-ohm resistor substituted for the generator.
- You need to minimize interference with other signals.
- You need to invert signals.

For detailed information about the relationship between signaling rate and interface cable distance, see the following standards:

- EIA-422-A, *Electrical Characteristics of Balanced Voltage Digital Interface Circuits*
- EIA-423-A, *Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits*

#### Related Documentation

- [Serial Interfaces Overview on page 293](#)

## Configuring the Serial Signal Handling

By default, normal signal handling is enabled for all signals. For each signal, the **normal** option applies to the normal signal handling for that signal, as defined by the following standards:

- TIA/EIA Standard 530
- ITU-T Recommendation V.35
- ITU-T Recommendation X.21

[Table 43 on page 302](#) shows the serial interface modes that support each signal type.

**Table 43: Signal Handling by Serial Interface Type**

| Signal                    | Serial Interfaces |
|---------------------------|-------------------|
| <b>From-DCE signals</b>   |                   |
| Clear to send (CTS)       | EIA-530 and V.35  |
| Data carrier detect (DCD) | EIA-530 and V.35  |
| Data set ready (DSR)      | EIA-530 and V.35  |
| Indication                | X.21 only         |
| Test mode (TM)            | EIA-530 only      |
| <b>To-DCE signals</b>     |                   |
| Control signal            | X.21 only         |



Table 43: Signal Handling by Serial Interface Type (*continued*)

| Signal                    | Serial Interfaces |
|---------------------------|-------------------|
| Data transfer ready (DTR) | EIA-530 and V.35  |
| Request to send (RTS)     | EIA-530 and V.35  |

You configure serial interface signal characteristics by including the **dce-options** or **dte-options** statement:

```
dce-options |dte-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

For EIA-530 and V.35 interfaces, configure to-DCE signals by including the **dtr** and **rts** statements, specifying the **assert**, **de-assert**, or **normal** option:

```
dtr (assert | de-assert | normal);
rts (assert | de-assert | normal);
```

For X.21 interfaces, configure to-DCE signals by including the **control-signal** statement, specifying the **assert**, **de-assert**, or **normal** option:

```
control-signal (assert | de-assert | normal);
```

*Assertion* is when the positive side of a given signal is at potential high-level output voltage (Voh), while the negative side of the same signal is at potential low-level output voltage (Vol). *Deassertion* is when the positive side of a given signal is at potential Vol, while the negative side of the same signal is at potential Voh.

For the DTR signal, you can configure normal signal handling using the signal for automatic resynchronization by including the **dtr** statement, and specifying the **auto-synchronize** option:

```
dtr {
 auto-synchronize {
 duration milliseconds;
 interval seconds;
 }
}
```

The pulse duration of resynchronization can be from 1 through 1000 milliseconds. The offset interval for resynchronization can be from 1 through 31 seconds.

For EIA-530 and V.35 interfaces, configure from-DCE signals by including the **cts**, **dcd**, and **dsr** statements, specifying the **ignore**, **normal**, or **require** option:

```
cts (ignore | normal | require);
dcd (ignore | normal | require);
dsr (ignore | normal | require);
```

For X.21 interfaces, configure from-DCE signals by including the **indication** statement, specifying the **ignore**, **normal**, or **require** option:

```
indication (ignore | normal | require);
```

For EIA-530 interfaces only, you can configure from-DCE test-mode (TM) signaling by including the **tm** statement, specifying the **ignore**, **normal**, or **require** option:

```
tm (ignore | normal | require);
```

To specify that the from-DCE signal must be asserted, include the **require** option in the configuration. To specify that the from-DCE signal must be ignored, include the **ignore** option in the configuration.



**NOTE:** For V.35 and X.21 interfaces, you cannot include the **tm** statement in the configuration.

For X.21 interfaces, you cannot include the **cts**, **dcd**, **dsr**, **dtr**, and **rts** statements in the configuration.

For EIA-530 and V.35 interfaces, you cannot include the **control-signal** and **indication** statements in the configuration.

For a complete list of serial options statements that are not supported by each serial interface mode, see [“Invalid Serial Interface Statements” on page 298](#).

---

To return to the default normal signal handling, delete the **require**, **ignore**, **assert**, **de-assert**, or **auto-synchronize** statement from the configuration, as shown in the following example:

```
[edit]
user@host# delete interfaces se-fpc/pic/port dte-options control-leads cts require
```

To explicitly configure normal signal handling, include the **control-signal** statement with the **normal** option:

```
control-signal normal;
```

You can configure the serial interface to ignore all control leads by including the **ignore-all** statement:

```
ignore-all;
```

You can include the **ignore-all** statement in the configuration only if you do not explicitly enable other signal handling options at the **[edit interfaces se-pim/0/port serial-options dce-options]** or **[edit interfaces se-fpc/pic/port serial-options dte-options]** hierarchy levels.

You can include the **control-signal**, **cts**, **dcd**, **dsr**, **dtr**, **indication**, **rts**, and **tm** statements at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options dte-options]**
- **[edit interfaces se-fpc/pic/port serial-options dte-options]**

## Configuring the Serial DTR Circuit

A balanced circuit has two currents that are equal in magnitude and opposite in phase. An unbalanced circuit has one current and a ground; if a pair of terminals is unbalanced, one side is connected to electrical ground and the other carries the signal. By default, the DTR circuit is balanced.

For EIA-530 and V.35 interfaces, configure the DTR circuit by including the **dtr-circuit** statement:

```
dtr-circuit (balanced | unbalanced);
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

## Configuring Serial Signal Polarities

Serial interfaces use a differential protocol signaling technique. Of the two serial signals associated with a circuit, the one referred to as the A signal is denoted with a plus sign, and the one referred to as the B signal is denoted with a minus sign; for example, DTR+ and DTR-. If DTR is low, then DTR+ is negative with respect to DTR-. If DTR is high, then DTR+ is positive with respect to DTR-.

By default, all signal polarities are positive. You can reverse this polarity on a Juniper Networks serial interface. You might need to do this if signals are miswired as a result of reversed polarities.

For EIA-530 and V.35 interfaces, configure signal polarities by including the **cts-polarity**, **dcd-polarity**, **dsr-polarity**, **dtr-polarity**, **rts-polarity**, and **tm-polarity** statements:

```
cts-polarity (negative | positive);
dcd-polarity (negative | positive);
dsr-polarity (negative | positive);
dtr-polarity (negative | positive);
rts-polarity (negative | positive);
tm-polarity (negative | positive);
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

For X.21 interfaces, configure signal polarities by including the **control-polarity** and **indication-polarity** statements:

**control-polarity** (negative | positive);  
**indication-polarity** (negative | positive);

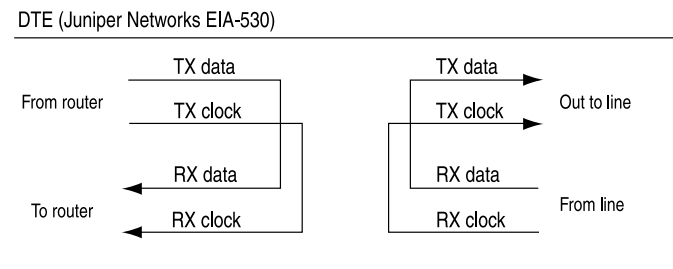
You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

## Configuring Serial Loopback Capability

From the router, remote line interface unit (LIU) loopback loops the TX (transmit) data and TX clock back to the router as RX (receive) data and RX clock. From the line, LIU loopback loops the RX data and RX clock back out the line as TX data and TX clock, as shown in [Figure 23 on page 306](#).

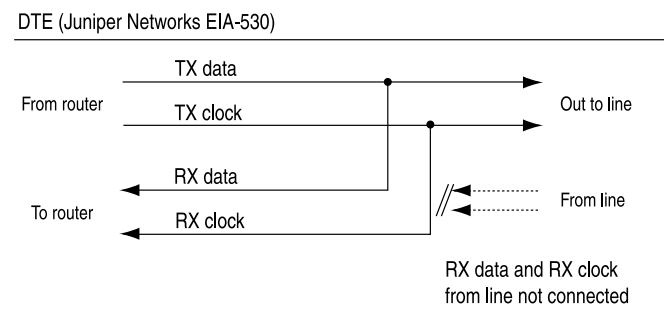
**Figure 23: Serial Interface LIU Loopback**



1972

DCE local and DCE remote control the EIA-530 interface-specific signals for enabling local and remote loopback on the link partner DCE. Local loopback is shown in [Figure 24 on page 306](#).

**Figure 24: Serial Interface Local Loopback**



1971

For EIA-530 interfaces, you can configure DCE local, DCE remote, local, and remote (LIU) loopback capability.

For V.35, you can configure remote LIU and local loopback capability. DCE local and DCE remote loopbacks are not supported on V.35 and X.21 interfaces. Local and remote loopbacks are not supported on X.21 interfaces.

To configure the loopback capability on a serial interface, include the **loopback** statement, specifying the **dce-local**, **dce-remote**, **local**, or **remote** option:

**loopback mode;**

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/O/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

To disable the loopback capability, remove the **loopback** statement from the configuration:

```
[edit]
user@host# delete interfaces se-fpc/pic/port serial-options loopback
```

You can determine whether there is an internal or external problem by checking the error counters in the output of the **show interface se-fpc/pic/port extensive** command:

```
user@host> show interfaces se-fpc/pic/port extensive
```

To Configure Serial Loopback Capability:

1. To determine the source of a problem, loop the packets on the local router, the local DCE, the remote DCE, and the remote line interface unit (LIU).
2. To do this, include the **no-keepalives** and **encapsulation cisco-hdlc** statements at the **[edit interfaces se-fpc/pic/port]** hierarchy level, and the **loopback local** option at the **[edit interfaces se-pim/O/port serial-options]** or **[edit interfaces se-fpc/pic/port serial-options]** hierarchy level. With this configuration, the link stays up, so you can loop ping packets to a remote router. The **loopback local** statement causes the interface to loop within the PIC just before the data reaches the transceiver.

```
[edit interfaces]
se-1/0/0 {
 no-keepalives;
 encapsulation cisco-hdlc;
 serial-options {
 loopback local;
 }
 unit 0 {
 family inet {
 address 10.100.100.1/24;
 }
 }
}
```

**Related Documentation** [Serial Interfaces Overview on page 293](#)

## Configuring Serial Line Encoding

---

By default, serial interfaces use non-return to zero (NRZ) line encoding. You can configure non-return to zero inverted (NRZI) line encoding if necessary.

To have the interface use NRZI line encoding, include the **encoding** statement, specifying the **nrzi** option:

```
encoding nrzi;
```

To explicitly configure the default NRZ line encoding, include the **encoding** statement, specifying the **nrz** option:

```
encoding nrz;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim*/0/*port* serial-options]
- [edit interfaces *se-fpc*/*pic*/*port* serial-options]

When setting the line encoding parameter, you must set the same value for paired ports. Ports 0 and 1 must share the same value.

## PART 4

# Monitoring and Troubleshooting Interfaces

- [Monitoring Interfaces on page 311](#)
- [Troubleshooting Interfaces on page 317](#)





# Monitoring Interfaces

- [Tracing Interface Operations Overview on page 311](#)
- [Tracing Operations of an Individual Router Interface on page 311](#)
- [Tracing Operations of the Interface Process on page 312](#)
- [Monitoring a PPP Session on page 313](#)
- [Tracing Operations of the pppd Process on page 314](#)

## Tracing Interface Operations Overview

---

You can trace the operations of individual router interfaces and those of the interface process (dcd). For a general discussion of tracing and of the precedence of multiple tracing operations, see the *Junos OS Administration Library for Routing Devices*.

For information about the operations of Virtual Router Resolution Protocol (VRRP)-enabled interfaces, see the *Junos OS High Availability Library for Routing Devices*.

### Related Documentation

- [Tracing Operations of an Individual Router Interface on page 311](#)
- [Tracing Operations of the Interface Process on page 312](#)

## Tracing Operations of an Individual Router Interface

---

To trace the operations of individual router interfaces, perform the following steps:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **traceoptions** option.

```
[edit interfaces interface-name]
user@host# edit traceoptions
```

3. Configure the tracing flag.

```
[edit interfaces interface-name traceoptions]
user@host# set flag flag-option
```

You can specify the following interface tracing flags:

- **all**—Trace all interface operations.
- **event**—Trace all interface events.
- **ipc**—Trace all interface interprocess communication (IPC) messages.
- **media**—Trace all interface media changes.

The interfaces **traceoptions** statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** files.

For more information about trace operations, see [“Tracing Operations of the Interface Process” on page 312](#).

**Related  
Documentation**

- [traceoptions on page 884](#)

---

## Tracing Operations of the Interface Process

---

To trace the operations of the router or switch interface process, dcd, perform the following steps:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the **traceoptions** statement.

```
[edit interfaces]
user@host# edit traceoptions
```

3. Configure the **no-remote-trace** option to disable remote tracing.

```
[edit interfaces traceoptions]
user@host# set no-remote-trace
```

4. Configure the **file filename** option.

```
[edit interfaces traceoptions]
user@host# edit file
```

5. Configure the **files number** option, **match regular-expression** option, **size size** option, and **world-readable | no-world-readable** option.

```
[edit interfaces traceoptions file]
user@host# set files number
user@host# set match regular-expression
user@host# set size size
user@host# set word-readable | no-world-readable
```

6. Configure the tracing flag.

```
[edit interfaces traceoptions]
user@host# set flag flag-option
```

7. Configure the **disable** option in **flag *flag-option*** statement to disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as **all**.

```
[edit interfaces traceoptions]
user@host# set flag flag-option disable
```

You can specify the following flags in the **interfaces traceoptions** statement:

- **all**—Enable all configuration logging.
- **change-events**—Log changes that produce configuration events.
- **gres-events**—Log the events related to GRES.
- **resource-usage**—Log the resource usage for different states.
- **config-states**—Log the configuration state machine changes.
- **kernel**—Log configuration IPC messages to kernel.
- **kernel-detail**—Log details of configuration messages to kernel.
- **select-events**—Log the events on select state machine.

By default, interface process operations are placed in the file named `dcd` and three 1-MB files of tracing information are maintained.

For general information about tracing, see the tracing and logging information in the *Junos OS Administration Library for Routing Devices*.

#### Related Documentation

- [Tracing Interface Operations Overview on page 311](#)
- [Tracing Operations of an Individual Router Interface on page 311](#)
- [traceoptions on page 886](#)

## Monitoring a PPP Session

You can monitor PPP packet exchanges. When monitoring is enabled, packets exchanged during a session are logged by default to `/var/log/pppd`, or to the file specified in the **traceoptions** statement.

To monitor a PPP session:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit]
user@host# edit protocols ppp
```

2. Include the **monitor-session** statement.

```
[edit protocols ppp]
user@host# monitor-session (interface-name | all);
```

When monitoring is configured, the operational mode commands **show ppp summary** and **show ppp interface** display a **Monitored** flag in the **Session flags** column or line.

Related [monitor-session on page 684](#)  
Documentation

---

## Tracing Operations of the pppd Process

---

You can trace the operations of the router's pppd process.

To trace the router's pppd process:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit]
user@host# edit protocols ppp
```

2. Include the **traceoptions** statement.

```
[edit protocols ppp]
traceoptions {
 file filename <files number> <match regular-expression> <size size> <world-readable |
 no-world-readable>;
 flag flag;
 level severity-level;
 no-remote-trace;
}
```

- To specify more than one tracing operation, include multiple **flag** statements.

You can specify the following flags in the **traceoptions** statement:

- **access**—Trace access code
- **address-pool**—Trace address pool code
- **all**—Trace all areas of code
- **auth**—Trace authentication code
- **chap**—Trace challenge handshake authentication protocol code
- **ci**—Trace CI code
- **config**—Trace configuration code
- **ifdb**—Trace interface database code
- **lcp**—Trace LCP state machine code
- **memory**—Trace memory management code
- **message**—Trace message processing code
- **mlppp**—Trace multilink point-to-point protocol code
- **ncp**—Trace NCP state machine code
- **pap**—Trace password authentication protocol code
- **ppp**—Trace PPP protocol processing code
- **radius**—Trace RADIUS processing code

- **redundancy**—Trace redundancy code
- **rtsock**—Trace routing socket code
- **session**—Trace session management code
- **signal**—Trace signal handling code
- **timer**—Trace timer code
- **ui**—Trace user interface code

Related [traceoptions on page 890](#)  
Documentation



# Troubleshooting Interfaces

- [Configuring Interface Diagnostics Tools to Test the Physical Layer Connections on page 317](#)
- [Troubleshooting: em0 Management Interface Link is Down on page 323](#)
- [Troubleshooting: fxp0 Management Interface Link is Down on page 324](#)
- [Troubleshooting: Faulty Ethernet Physical Interface on an M Series, an MX Series, or a T Series Router on page 326](#)

## Configuring Interface Diagnostics Tools to Test the Physical Layer Connections

- [Configuring Loopback Testing on page 317](#)
- [Configuring BERT Testing on page 319](#)
- [Starting and Stopping a BERT Test on page 322](#)

### Configuring Loopback Testing

Loopback testing allows you to verify the connectivity of a circuit. You can configure any of the following interfaces to execute a loopback test: aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, E1, E3, NxDSO, serial, SONET/SDH, T1, and T3.

The physical path of a network data circuit usually consists of segments interconnected by devices that repeat and regenerate the transmission signal. The transmit path on one device connects to the receive path on the next device. If a circuit fault occurs in the form of a line break or a signal corruption, you can isolate the problem by using a loopback test. Loopback tests allow you to isolate segments of the circuit and test them separately.

To do this, configure a *line loopback* on one of the routers. Instead of transmitting the signal toward the far-end device, the line loopback sends the signal back to the originating router. If the originating router receives back its own Data Link Layer packets, you have verified that the problem is beyond the originating router. Next, configure a line loopback farther away from the local router. If this originating router does not receive its own Data Link Layer packets, you can assume that the problem is on one of the segments between the local router and the remote router's interface card. In this case, the next troubleshooting step is to configure a line loopback closer to the local router to find the source of the problem.

The following types of loopback testing are supported by Junos OS:

- DCE local—Loops packets back on the local data circuit-terminating equipment (DCE).
- DCE remote—Loops packets back on the remote DCE.
- Local—Useful for troubleshooting physical PIC errors. Configuring local loopback on an interface allows transmission of packets to the channel service unit (CSU) and then to the circuit toward the far-end device. The interface receives its own transmission, which includes data and timing information, on the local router's PIC. The data received from the CSU is ignored. To test a local loopback, issue the **show interfaces *interface-name*** command. If PPP keepalives transmitted on the interface are received by the PIC, the **Device Flags** field contains the output **Loop-Detected**.
- Payload—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A payload loopback loops data only (without clocking information) on the remote router's PIC. With payload loopback, overhead is recalculated.
- Remote—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A remote loopback loops packets, including both data and timing information, back on the remote router's interface card. A router at one end of the circuit initiates a remote loopback toward its remote partner. When you configure a remote loopback, the packets received from the physical circuit and CSU are received by the interface. Those packets are then retransmitted by the PIC back toward the CSU and the circuit. This loopback tests all the intermediate transmission segments.

Table 44 on page 318 shows the loopback modes supported on the various interface types.

**Table 44: Loopback Modes by Interface Type**

| Interface                                            | Loopback Modes   | Usage Guidelines                                                                                                                                                                                                                                                     |
|------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregated Ethernet, Fast Ethernet, Gigabit Ethernet | Local            | <i>Configuring Ethernet Loopback Capability</i>                                                                                                                                                                                                                      |
| Circuit Emulation E1                                 | Local and remote | <i>Configuring E1 Loopback Capability</i>                                                                                                                                                                                                                            |
| Circuit Emulation T1                                 | Local and remote | <i>Configuring T1 Loopback Capability</i>                                                                                                                                                                                                                            |
| E1 and E3                                            | Local and remote | <i>Configuring E1 Loopback Capability and Configuring E3 Loopback Capability</i>                                                                                                                                                                                     |
| NxDSO                                                | Payload          | <i>Configuring Channelized E1 IQ and IQE Interfaces, Configuring T1 and NxDSO Interfaces, Configuring Channelized OC12/STM4 IQ and IQE Interfaces (SONET Mode), Configuring Channelized STM1 IQ and IQE Interfaces, and Configuring Channelized T3 IQ Interfaces</i> |
| Serial (V.35 and X.21)                               | Local and remote | <a href="#">“Configuring Serial Loopback Capability” on page 306</a>                                                                                                                                                                                                 |



Table 44: Loopback Modes by Interface Type (*continued*)

| Interface        | Loopback Modes                           | Usage Guidelines                                                                                                                                    |
|------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial (EIA-530) | DCE local, DCE remote, local, and remote | <a href="#">"Configuring Serial Loopback Capability" on page 306</a>                                                                                |
| SONET/SDH        | Local and remote                         | <i>Configuring SONET/SDH Loopback Capability to Identify a Problem as Internal or External</i>                                                      |
| T1 and T3        | Local, payload, and remote               | <i>Configuring T1 Loopback Capability and Configuring T3 Loopback Capability</i><br><br><i>See also Configuring the T1 Remote Loopback Response</i> |

To configure loopback testing, include the **loopback** statement:

```
user@host# loopback mode;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* [aggregated-ether-options](#)]
- [edit interfaces *interface-name* [ds0-options](#)]
- [edit interfaces *interface-name* [e1-options](#)]
- [edit interfaces *interface-name* [e3-options](#)]
- [edit interfaces *interface-name* [fastether-options](#)]
- [edit interfaces *interface-name* [gigether-options](#)]
- [edit interfaces *interface-name* [serial-options](#)]
- [edit interfaces *interface-name* [sonet-options](#)]
- [edit interfaces *interface-name* [t1-options](#)]
- [edit interfaces *interface-name* [t3-options](#)]

## Configuring BERT Testing

To configure BERT:

- Configure the duration of the test.

```
[edit interfaces interface-name interface-type-options]
user@host# bert-period seconds;
```

You can configure the BERT period to last from 1 through 239 seconds on some PICs and from 1 through 240 seconds on other PICs. By default, the BERT period is 10 seconds.

- Configure the error rate to monitor when the inbound pattern is received.

```
[edit interfaces interface-name interface-type-options]
user@host# bert-error-rate rate;
```

*rate* is the bit error rate. This can be an integer from 0 through 7, which corresponds to a bit error rate from  $10^{-0}$  (1 error per bit) to  $10^{-7}$  (1 error per 10 million bits).

- Configure the bit pattern to send on the transmit path.

```
[edit interfaces interface-name interface-type-options]
user@host# bert-algorithm algorithm;
```

*algorithm* is the pattern to send in the bit stream. For a list of supported algorithms, enter a ? after the **bert-algorithm** statement; for example:

```
[edit interfaces t1-0/0/0 t1-options]
user@host# set bert-algorithm ?
Possible completions:
pseudo-2e11-o152 Pattern is 2^11 -1 (per 0.152 standard)
pseudo-2e15-o151 Pattern is 2^15 - 1 (per 0.152 standard)
pseudo-2e20-o151 Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e20-o153 Pattern is 2^20 - 1 (per 0.153 standard)
...
```

For specific hierarchy information, see the individual interface types.



**NOTE:** The four-port E1 PIC supports only the following algorithms:

```
pseudo-2e11-o152 Pattern is 2^11 -1 (per 0.152 standard)
pseudo-2e15-o151 Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151 Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e23-o151 Pattern is 2^23 (per 0.151 standard)
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



**NOTE:** The 12-port T1/E1 Circuit Emulation (CE) PIC supports only the following algorithms:

```
all-ones-repeating Repeating one bits
all-zeros-repeating Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros Alternating ones and zeros
pseudo-2e11-o152 Pattern is 2^11 -1 (per 0.152 standard)
pseudo-2e15-o151 Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151 Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e7 Pattern is 2^7 - 1
pseudo-2e9-o153 Pattern is 2^9 - 1 (per 0.153 standard)
repeating-1-in-4 1 bit in 4 is set
repeating-1-in-8 1 bit in 8 is set
repeating-3-in-24 3 bits in 24 are set
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



**NOTE:** The IQE PICs support only the following algorithms:

```

all-ones-repeating Repeating one bits
all-zeros-repeating Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros Alternating ones and zeros
pseudo-2e9-o153 Pattern is 2^9 -1 (per 0.153 (511 type) standard)
pseudo-2e11-o152 Pattern is 2^11 -1 (per 0.152 and 0.153 (2047 type)
standards)
pseudo-2e15-o151 Pattern is 2^15 -1 (per 0.151 standard)
pseudo-2e20-o151 Pattern is 2^20 -1 (per 0.151 standard)
pseudo-2e20-o153 Pattern is 2^20 -1 (per 0.153 standard)
pseudo-2e23-o151 Pattern is 2^23 -1 (per 0.151 standard)
repeating-1-in-4 1 bit in 4 is set
repeating-1-in-8 1 bit in 8 is set
repeating-3-in-24 3 bits in 24 are set

```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



**NOTE:** BERT is supported on the PDH interfaces of the Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP and the DS3/E3 MIC. The following BERT algorithms are supported:

```

all-ones-repeating Repeating one bits
all-zeros-repeating Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros Alternating ones and zeros
repeating-1-in-4 1 bit in 4 is set
repeating-1-in-8 1 bit in 8 is set
repeating-3-in-24 3 bits in 24 are set
pseudo-2e9-o153 Pattern is 2^9 - 1 (per 0.153 standard)
pseudo-2e11-o152 Pattern is 2^11 - 1 (per 0.152 standard)
pseudo-2e15-o151 Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151 Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e20-o153 Pattern is 2^20 - 1 (per 0.153 standard)
pseudo-2e23-o151 Pattern is 2^23 (per 0.151 standard)

```

Table 45 on page 321 shows the BERT capabilities for various interface types.

**Table 45: BERT Capabilities by Interface Type**

| Interface                                              | T1 BERT          | T3 BERT | Comments                                                             |
|--------------------------------------------------------|------------------|---------|----------------------------------------------------------------------|
| 12-port T1/E1<br>Circuit Emulation                     | Yes (ports 0–11) | —       | <ul style="list-style-type: none"> <li>Limited algorithms</li> </ul> |
| 4-port<br>Channelized<br>OC3/STM1<br>Circuit Emulation | Yes (port 0–3)   | —       | <ul style="list-style-type: none"> <li>Limited algorithms</li> </ul> |

Table 45: BERT Capabilities by Interface Type (*continued*)

| Interface                          | T1 BERT            | T3 BERT                     | Comments                                                                                                                                                                              |
|------------------------------------|--------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1 or T1                           | Yes (port 0–3)     | Yes (port 0–3)              | <ul style="list-style-type: none"> <li>• Single port at a time</li> <li>• Limited algorithms</li> </ul>                                                                               |
| E3 or T3                           | Yes (port 0–3)     | Yes (port 0–3)              | <ul style="list-style-type: none"> <li>• Single port at a time</li> </ul>                                                                                                             |
| Channelized OC12                   | —                  | Yes (channel 0–11)          | <ul style="list-style-type: none"> <li>• Single channel at a time</li> <li>• Limited algorithms</li> <li>• No bit count</li> </ul>                                                    |
| Channelized STM1                   | Yes (channel 0–62) | —                           | <ul style="list-style-type: none"> <li>• Multiple channels</li> <li>• Only one algorithm</li> <li>• No error insert</li> <li>• No bit count</li> </ul>                                |
| Channelized T3 and Multichannel T3 | Yes (channel 0–27) | Yes (port 0–3 on channel 0) | <ul style="list-style-type: none"> <li>• Multiple ports and channels</li> <li>• Limited algorithms for T1</li> <li>• No error insert for T1</li> <li>• No bit count for T1</li> </ul> |

These limitations do not apply to channelized IQ interfaces. For information about BERT capabilities on channelized IQ interfaces, see *Channelized IQ and IQE Interfaces Properties*.

## Starting and Stopping a BERT Test

Before you can start the BERT test, you must disable the interface. To do this, include the **disable** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
 disable;
```

After you configure the BERT properties and commit the configuration, begin the test by issuing the **test interface *interface-name interface-type-bert-start*** operational mode command:

```
user@host> test interface interface-name interface-type-bert-start
```

The test runs for the duration you specify with the **bert-period** statement. If you want to terminate the test sooner, issue the **test interface *interface-name interface-type-bert-stop*** command:

```
user@host> test interface interface-name interface-type-bert-stop
```

For example:

```
user@host> test interface t3-1/2/0 t3-bert-start
user@host> test interface t3-1/2/0 t3-bert-stop
```

To view the results of the BERT test, issue the **show interfaces extensive | find BERT** command:

```
user@host> show interfaces interface-name extensive | find BERT
```

For more information about running and evaluating the results of the BERT procedure, see the [CLI Explorer](#).



**NOTE:** To exchange BERT patterns between a local router and a remote router, include the `loopback remote` statement in the interface configuration at the remote end of the link. From the local router, issue the `test interface` command.

**Related Documentation**

- *show interfaces diagnostics optics (Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, 100-Gigabit Ethernet, and Virtual Chassis Port)*

## Troubleshooting: em0 Management Interface Link is Down

**Problem** **Description:** **Ethernet Link Down** alarm is raised when you run the `show chassis alarm` operational mode command on a T640 router, a T1600 router, T4000 router, or a TX Matrix Plus router.

**Diagnosis** Perform the following tests to check if the em0 management interface is down on the master Routing Engine or the backup Routing Engine:

1. Run the `show chassis alarms` command.

### show chassis alarms

```
user@host0> show chassis alarms
1 alarms currently active
Alarm time Class Description
2011-10-19 11:13:02 MYT Major Host 1 em0 : Ethernet Link Down
```

Is the alarm **Ethernet Link Down** displayed against the em0 interface of the master Routing Engine (Host 0)?

- Yes: Contact JTAC for further assistance.
- No: Continue to the next diagnostic test.

2. Run the `show interfaces em0` and the `show interfaces em0 terse` operational mode commands.

### show interfaces em0

```
user@host> show interfaces em0
Physical interface: em0, Enabled, Physical link is Up
Interface index: 1, SNMP ifIndex: 1
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 100mbps
Device flags : Present Running
Interface flags: SNMP-Traps
...
```

### show interfaces em0 terse

```
user@host> show interfaces em0 terse
Interface Admin Link Proto Local Remote
em0 up up
em0.0 up up inet 10.100.100.1/30
```

Is the em0 interface on the master Routing Engine **up**?

- Yes: Continue to resolution.
- No: Contact JTAC for further assistance

#### Resolution *To Resolve This Issue*

From the aforementioned diagnosis, we ascertain that the chassis alarm has been raised for the em0 management interface in the backup Routing Engine (Host 1) and not for the master Routing Engine (Host 0).

Implement one of the following solutions on the backup Routing Engine to resolve this issue:

- Disable the em0 interface in the backup Routing Engine:
  1. In configuration mode, go to the **[edit groups re1]** hierarchy level.

```
user@host1# edit groups re1
```
  2. Disable the em0 interface.

```
[edit groups re1]
user@host1# set interfaces em0 disable
```
- Ignore the alarm:
  1. In configuration mode, go to the **[edit chassis]** hierarchy level.

```
user@host1# edit chassis
```
  2. Ignore the **Ethernet link down** alarm on the management interface by setting the **management-ethernet link-down** alarm option to **ignore**.

```
[edit chassis]
user@host1# set alarm management-ethernet link-down ignore
```

- Related Documentation**
- [Supported Routing Engines by Router on page 14](#)
  - *show chassis alarms*

---

## Troubleshooting: fxp0 Management Interface Link is Down

- |                |                                                                                                                                                                                                                                                |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Problem</b> | <b>Description:</b> Ethernet Link Down alarm is raised when you run the <b>show chassis alarm</b> operational mode command on an M Series router, an MX Series router, a T320 router, a T640 router, a T1600 router, or on a TX Matrix router. |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Diagnosis** Perform the following tests to check if the fxp0 interface is down on the master Routing Engine or the backup Routing Engine:

1. Run the **show chassis alarms** command.

#### show chassis alarms

```
user@host0> show chassis alarms
1 alarms currently active
Alarm time Class Description
2011-10-19 11:13:02 MYT Major Host 1 fxp0 : Ethernet Link Down
```

Is the alarm **Ethernet Link Down** displayed against the fxp0 interface of the master Routing Engine (Host 0)?

- Yes: Contact JTAC for further assistance.
- No: Continue to the next diagnostic test.

2. Run the **show interfaces fxp0** and the **show interfaces fxp0 terse** operational mode commands.

#### show interfaces fxp0

```
user@host> show interfaces fxp0
Physical interface: fxp0, Enabled, Physical link is Up
Interface index: 1, SNMP ifIndex: 1
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 100mbps
Device flags : Present Running
Interface flags: SNMP-Traps
...
```

#### show interfaces fxp0 terse

```
user@host> show interfaces fxp0 terse
Interface Admin Link Proto Local Remote
fxp0 up up
fxp0.0 up up inet 10.100.100.1/30
```

Is the fxp0 interface on the master Routing Engine **up**?

- Yes: Continue to resolution.
- No: Contact JTAC for further assistance

#### **Resolution** *To Resolve This Issue*

From the diagnosis, we ascertain that the chassis alarm has been raised for the fxp0 management interface in the backup Routing Engine (Host 1) and not for the master Routing Engine (Host 0).

Implement one of the following solutions on the backup Routing Engine to avoid this issue:

- Disable the fxp0 interface in the backup Routing Engine:

1. In configuration mode, go to the **[edit groups re1]** hierarchy level.

```
user@host1# edit groups re1
```

2. Disable the fxp0 interface.

```
[edit groups re1]
user@host1# set interfaces fxp0 disable
```

- Ignore the alarm:

1. In configuration mode, go to the **[edit chassis]** hierarchy level.

```
user@host1# edit chassis
```

2. Ignore the **Ethernet link down** alarm on the management interface by setting the **management-ethernet link-down** alarm option to **ignore**.

```
[edit chassis]
user@host1# set alarm management-ethernet link-down ignore
```

**Related  
Documentation**

- [Supported Routing Engines by Router on page 14](#)
- [show chassis alarms](#)

---

## Troubleshooting: Faulty Ethernet Physical Interface on an M Series, an MX Series, or a T Series Router

---

You can follow the basic troubleshooting checklist as explained in the following topics from one through five to troubleshoot an Ethernet physical interface on an M Series, MX Series, or a T Series router.

1. [Checking the Cable Connection on page 326](#)
2. [Checking the Physical Link Status of the Interface on page 327](#)
3. [Checking the Interface Statistics in Detail on page 328](#)
4. [Performing the Loopback Diagnostic Test on page 330](#)
5. [Checking Other Possibilities on page 332](#)
6. [To Enable a Physical Interface on page 333](#)

### Checking the Cable Connection

|                |                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------|
| <b>Problem</b> | <b>Description:</b> Packets are not received or transmitted over the Ethernet physical interface. |
|----------------|---------------------------------------------------------------------------------------------------|

- |                  |                                                                                                                                                                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Diagnosis</b> | <ol style="list-style-type: none"><li>1. Is the correct cable connected to the correct port?<ul style="list-style-type: none"><li>• Yes: Continue to <a href="#">“Checking the Physical Link Status of the Interface” on page 327</a>.</li></ul></li></ol> |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



- No: See [“Resolving Cabling Issue” on page 327](#).

### Resolution *Resolving Cabling Issue*

Perform one or more of the following steps to resolve the cabling issue:

1. Connect the cable properly on the local and remote ends without any loose connections.
2. Swap the Ethernet cable for a known good cable if the existing cable is damaged.
3. Connect a single-mode fiber cable to a single-mode interface only and a multimode fiber cable to a multimode interface only. To check fiber optic cable integrity, see [“Checking Fiber Optic Cable Integrity” on page 327](#).
4. Connect the correct small form-factor pluggable transceiver (SFP) on both sides of the cable.

### *Checking Fiber Optic Cable Integrity*

To check the integrity of fiber optic cable with an external cable diagnostic testing tool:



**NOTE:** A single-mode fiber cable must be connected to a single-mode interface and a multi-mode fiber cable must be connected to a multi-mode interface.

1. Measure the received light level at the receiver ( $R_x$ ) port to see whether the received light level is within the receiver specification of the Ethernet interface.
2. Measure transmitted light level at the transmitter ( $T_x$ ) port to see whether the transmitted light level is within the transmitter specification of the Ethernet interface.

## Checking the Physical Link Status of the Interface

**Problem**    **Description:** Unable to transmit and receive packets on the Ethernet interface even though the cable connection is correct.

**Solution**    To display the physical link status of the interface, run the **show interface *interface-name* media** operational mode command. For example, on the ge-5/0/1 interface.

```
user@host> show interfaces ge-5/0/1 media
Physical interface: ge-5/0/1, Enabled, Physical link is Up
 Interface index: 317, SNMP ifIndex: 1602
 Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, BPDU Error: None,
 MAC-REWRITE Error: None, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
 Remote fault: Online, Speed-negotiation: Disabled,
 Auto-MDIX: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
```

```
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Current address: 2c:6b:f5:4c:26:73, Hardware address: 2c:6b:f5:4c:26:73
Last flapped : 2012-11-30 01:25:37 UTC (03:46:55 ago)
Input rate : 880 bps (1 pps)
Output rate : 312 bps (0 pps)
Active alarms : None
Active defects : None
MAC statistics:
 Input bytes: 901296, Input packets: 9799, Output bytes: 976587, Output packets:
10451
Filter statistics:
 Filtered packets: 68, Padded packets: 0, Output packet errors: 0
Autonegotiation information:
 Negotiation status: Complete
 Link partner:
 Link mode: Full-duplex, Flow control: Symmetric/Asymmetric, Remote fault:
OK
 Local resolution:
 Flow control: Symmetric, Remote fault: Link OK
Interface transmit statistics: Disabled
```

For information about **show interfaces *interface-name* media**, see [show interfaces \(Gigabit Ethernet\)](#).

- 
- Diagnosis**
1. Are there any connectivity problems such as input errors and packet loss even though the **Enabled** field displays **Physical link is Up** status and the **Active alarms** and **Active defect** field displays **None**?
    - Yes: Go to [“Checking the Interface Statistics in Detail” on page 328](#).
    - No: Continue to the next diagnostic test.
  2. Does the **Enabled** field display **Physical link is Down** status and the **Active alarms** and **Active defect** field display **Link**?
    - Yes: The interface is either not connected correctly or is not receiving a valid signal. Go to [“Resolving Cabling Issue” on page 327](#).
    - No: Continue.

## Checking the Interface Statistics in Detail

**Problem**    **Description:** The physical interface is not working even though the **Enabled** field displays **Physical link is Up** status and the **Active alarms** and **Active defect** field displays **None**.

**Solution**    To display the interface statistics in detail, run the **show interface *interface-name* extensive** operational command. For example, on ge-5/0/1 interface.

```
user@host> show interfaces ge-5/0/1 extensive
Physical interface: ge-5/0/1, Enabled, Physical link is Up
Interface index: 317, SNMP ifIndex: 1602, Generation: 322
Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, BPDU Error: None,
```

```

MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online, Speed-negotiation: Disabled,
Auto-MDIX: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 2c:6b:f5:4c:26:73, Hardware address: 2c:6b:f5:4c:26:73
Last flapped : 2012-11-30 01:25:37 UTC (04:38:32 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 806283 0 bps
Output bytes : 1153215 424 bps
Input packets : 10818 0 pps
Output packets: 11536 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
Label-switched interface (LSI) traffic statistics:
Input bytes : 0 0 bps
Input packets : 0 0 pps
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 233060,
L3 incompletes: 0, L2 channel errors: 0,
L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 11, Errors: 0, Drops: 0, Collisions: 0, Aged packets:
0, FIFO errors: 0, HS link CRC errors: 0,
MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 3216 3216 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 8320 8320 0

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control
Active alarms : None
Active defects : None
MAC statistics:
Total octets Receive Transmit
Total packets 1007655 1082219
Unicast packets 10886 11536
Broadcast packets 4350 4184
Broadcast packets 32 77

```

```

Multicast packets 6504 7275
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Filter statistics:
 Input packet count 10886
 Input packet rejects 68
 Input DA rejects 68
 Input SA rejects 0
 Output packet count 11536
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
 Negotiation status: Complete
 Link partner:
 Link mode: Full-duplex, Flow control: Symmetric/Asymmetric, Remote fault:
OK
 Local resolution:
 Flow control: Symmetric, Remote fault: Link OK
Packet Forwarding Engine configuration:
 Destination slot: 5
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 % bps % usec low
 0 best-effort 95 950000000 95 0
none
 3 network-control 5 50000000 5 0
none
 Interface transmit statistics: Disabled

```

For information about **show interfaces *interface-name* detail**, see [show interfaces \(Gigabit Ethernet\)](#).

- Diagnosis**
1. Does the **Policed discards**, **L2 channel errors**, **Input DA rejects**, or the **Input SA rejects** field display any errors?

For information about the errors, see [show interfaces \(Gigabit Ethernet\)](#).

- Yes: Resolve the errors as needed. Resolving these errors is beyond the scope of this topic.
- No: Continue with “[Performing the Loopback Diagnostic Test](#)” on page 330.

## Performing the Loopback Diagnostic Test

**Problem**    **Description:** The interface cable is connected correctly and there are no alarms or errors associated with the Ethernet physical interface yet the interface is not working.

**Solution** To check whether the Ethernet port or PIC is faulty, you must perform the internal loopback test and hardware loopback test.

To perform a internal loopback diagnostic test on an Ethernet interface, for example on ge-5/0/1 interface:

1. In configuration mode, go to the **[edit interfaces ge-5/0/1]** hierarchy level.

```
[edit]
user@host# edit interface ge-5/0/1
```

2. Set the **igether-options** option as loopback, commit the configuration and quit configuration mode.

```
[edit interfaces ge-5/0/1
user@host# set igether-options loopback
user@host# commit
user@host# quit
```

3. In operational mode, execute the **show interfaces ge-5/0/1 media** command.

```
user@host> show interfaces ge-5/0/1 media
Physical interface: ge-5/0/1, Enabled, Physical link is Up
 Interface index: 317, SNMP ifIndex: 1602
 Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, BPDU Error: None,
 MAC-REWRITE Error: None, Loopback: Enabled,
 Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
 Remote fault: Online, Speed-negotiation: Disabled,
 Auto-MDIX: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Current address: 2c:6b:f5:4c:26:73, Hardware address: 2c:6b:f5:4c:26:73
 Last flapped : 2012-11-30 01:25:37 UTC (03:46:55 ago)
 Input rate : 880 bps (1 pps)
 Output rate : 312 bps (0 pps)
 Active alarms : None
 Active defects: None
 MAC statistics:
 Input bytes: 901296, Input packets: 9799, Output bytes: 976587, Output
 packets: 10451
 Filter statistics:
 Filtered packets: 68, Padded packets: 0, Output packet errors: 0
 Autonegotiation information:
 Negotiation status: Complete
 Link partner:
 Link mode: Full-duplex, Flow control: Symmetric/Asymmetric, Remote
 fault: OK
 Local resolution:
 Flow control: Symmetric, Remote fault: Link OK
 Interface transmit statistics: Disabled
```



**NOTE:** Delete the loopback statement after completing your diagnosis.

Execute one of the following steps for a hardware loopback diagnostic test as needed:

- For an Ethernet PIC with a fiber optic interface—Physically loop the  $T_x$  and  $R_x$  port and check the status of the physical link with the **show interfaces *interface-name* media** operational mode command.
- For an Ethernet PIC with an RJ-45 Ethernet interface—Build a loopback plug by crossing pin 1 ( $T_x +$ ) to pin 3 ( $R_x +$ ) together and pin 2 ( $T_x -$ ) and pin 6 ( $R_x -$ ) together and check the status of the physical link with the **show interfaces *interface-name* media** operational mode command.



**NOTE:** For information about loopback testing, see *Performing Loopback Testing for Fast Ethernet and Gigabit Ethernet Interfaces*.

- Diagnosis**
1. Does the **Enabled** field display **Physical link is Up** status and the **Active alarms and Active defect** field display **None** when you perform the loopback test?
    - Yes: Go to the “[Checking Other Possibilities](#)” on page 332 section.
    - No: Continue to the next diagnostic test.
  2. When the Ethernet interface is connected to a remote Ethernet device over multiple patch panels, check to see whether the connection can be looped back at the different patch panels so you can conduct a loopback diagnostic test. Is the loopback diagnostic test successful?
    - Yes: Go to the “[Checking Other Possibilities](#)” on page 332 section.
    - No: Contact JTAC for further assistance.

## Checking Other Possibilities

**Problem**    **Description:** Loopback diagnostic test is successful but unable to transmit and receive packets on the Ethernet interface.

**Solution**    Use the following commands as needed to troubleshoot an Ethernet interface, for example, an ge-5/0/1 interface:

- Run the **show interfaces *interface-name* terse** operational command to check if the physical interface and logical interfaces are administratively disabled. For example, on ge-5/0/1 interface.

```
user@host> show interfaces ge-5/0/1 terse
 Interface Admin Link Proto Local Remote
```

```

ge-5/0/1 up up
ge-5/0/1.0 up up inet 20.1.1.2/24

```

- Diagnosis**
- Does the physical interface and its corresponding logical interfaces display **down** in the output of the **show interfaces *interface-name* terse** operational mode command?
    - Yes: Enable the interfaces as shown in [“To Enable a Physical Interface” on page 333](#).
    - No: Continue to the next diagnostic test.
  - Are the **speed**, **duplex**, and **auto-negotiation** fields in the output of **show interfaces *interface-name* extensive** operational mode command correctly set for the interface?



**NOTE:** Check if the associated Flexible PIC Concentrator (FPC), Modular Port Concentrator (MPC), or Dense Port Concentrator (DPC) and its Modular Interface Card (MIC) or PIC with its 10-gigabit small form-factor pluggable transceiver (XFP) or SFP supports speed and auto-negotiation settings.

- Yes: Check *Monitoring Fast Ethernet and Gigabit Ethernet Interfaces* for more troubleshooting tips.
- No: Contact JTAC for further assistance.

## To Enable a Physical Interface

To enable a physical interface:

- In configuration mode, go to the **[edit interfaces]** hierarchy level.

```

[edit]
user@host# edit interfaces

```

- Check if the interface is administratively disabled by executing the **show** command on the interface. For example on ge-5/0/1 interface.

```

user@host# show ge-5/0/1
disable;

```

- Enable the interface and commit.

```

[edit interfaces]
user@host# delete interface-name disable
user@host# commit

```





## PART 5

# Configuration Statements and Operational Commands

- [Configuration Statements on page 337](#)
- [Interface Operational Commands on page 957](#)
- [ANCP Operational Commands on page 1339](#)
- [BFD Operational Commands on page 1377](#)
- [BGP Operational Commands on page 1391](#)
- [ES-IS Operational Commands on page 1437](#)
- [IP Multicast Operational Commands on page 1447](#)
- [IPv6 Operational Commands on page 1669](#)
- [IS-IS Operational Commands on page 1677](#)
- [LLDP Operational Commands on page 1731](#)
- [MVRP Operational Commands on page 1751](#)
- [OSPF Operational Commands on page 1763](#)
- [Protocol-Independent Routing Operational Commands on page 1841](#)
- [RIP Operational Commands on page 2057](#)
- [RIPng Operational Commands on page 2067](#)
- [Firewall Filter Operational Commands on page 2077](#)
- [Layer 2 Bridging and Switching Operational Commands on page 2099](#)
- [VPN Operational Commands on page 2129](#)



## CHAPTER 13

# Configuration Statements

- [\[edit chassis\] Hierarchy Level on page 354](#)
- [\[edit interfaces\] Hierarchy Level on page 356](#)
- [\[edit logical-systems\] Hierarchy Level on page 372](#)
- [\[edit protocols connections\] Hierarchy Level on page 376](#)
- [\[edit protocols dot1x\] Hierarchy Level on page 377](#)
- [\[edit protocols iccp\] Hierarchy Level on page 377](#)
- [\[edit protocols lacp\] Hierarchy Level on page 378](#)
- [\[edit protocols oam\] Hierarchy Level on page 378](#)
- [\[edit protocols ppp\] Hierarchy Level on page 380](#)
- [\[edit protocols pppoe\] Hierarchy Level on page 381](#)
- [\[edit protocols protection-group\] Hierarchy Level on page 381](#)
- [\[edit protocols vrrp\] Hierarchy Level on page 382](#)
- [\[edit system processes\] Hierarchy Level on page 382](#)
- [802.3ad on page 383](#)
- [accept on page 384](#)
- [accept-source-mac on page 386](#)
- [access-concentrator on page 387](#)
- [access-profile on page 388](#)
- [accounting on page 389](#)
- [accounting-profile on page 389](#)
- [acfc on page 390](#)
- [acknowledge-retries on page 391](#)
- [acknowledge-timer on page 392](#)
- [action \(OAM\) on page 392](#)
- [action \(Policer\) on page 393](#)
- [action-profile \(Applying to CFM\) on page 393](#)
- [action-profile \(Defining for CFM\) on page 394](#)
- [action-profile \(Defining for LFM\) on page 395](#)

- [action-red-differential-delay](#) on page 396
- [address](#) on page 397
- [advertise-interval](#) on page 400
- [age](#) on page 401
- [agent-specifier](#) on page 402
- [aggregate \(Gigabit Ethernet CoS Policer\)](#) on page 403
- [aggregate \(Hierarchical Policer\)](#) on page 404
- [aggregate \(SONET/SDH\)](#) on page 404
- [aggregate-ports](#) on page 405
- [aggregated-ether-options](#) on page 406
- [aggregated-sonet-options](#) on page 407
- [alarm \(optics-options\)](#) on page 408
- [alias \(Interfaces\)](#) on page 409
- [allow-any-vci](#) on page 409
- [allow-fragmentation](#) on page 410
- [allow-remote-loopback](#) on page 410
- [annex](#) on page 411
- [apply-action-profile](#) on page 411
- [aps](#) on page 412
- [arp \(Interfaces\)](#) on page 413
- [asynchronous-notification](#) on page 414
- [atm-encapsulation](#) on page 415
- [atm-options](#) on page 416
- [atm-scheduler-map](#) on page 417
- [authentication](#) on page 418
- [authentication-key](#) on page 419
- [authentication-profile-name](#) on page 419
- [authenticator](#) on page 420
- [auto-configure](#) on page 421
- [auto-discovery](#) on page 422
- [auto-negotiation](#) on page 423
- [backup-destination](#) on page 424
- [backup-interface](#) on page 425
- [backup-options](#) on page 425
- [bandwidth \(Interfaces\)](#) on page 426
- [bandwidth-limit \(Hierarchical Policer\)](#) on page 427
- [bandwidth-limit \(Policer for Gigabit Ethernet Interfaces\)](#) on page 428

- [bert-algorithm](#) on page 429
- [bert-error-rate](#) on page 431
- [bert-period](#) on page 433
- [bridge-domain](#) on page 434
- [broadcast](#) on page 435
- [buildout \(E3 or T3 over ATM Interfaces\)](#) on page 436
- [buildout \(T1 Interfaces\)](#) on page 437
- [bundle](#) on page 438
- [burst-size-limit \(Hierarchical Policer\)](#) on page 439
- [burst-size-limit \(Policer for Gigabit Ethernet Interfaces\)](#) on page 440
- [byte-encoding](#) on page 441
- [bytes](#) on page 442
- [calculation-weight](#) on page 443
- [cbit-parity](#) on page 444
- [cbr](#) on page 445
- [cell-bundle-size](#) on page 446
- [chap](#) on page 447
- [chap-secret](#) on page 448
- [circuit-type](#) on page 448
- [cisco-interoperability](#) on page 449
- [classifier](#) on page 449
- [clear-dont-fragment-bit](#) on page 450
- [clock-rate](#) on page 451
- [clocking](#) on page 452
- [clocking-mode](#) on page 453
- [community](#) on page 454
- [compatibility-mode](#) on page 457
- [compression \(PPP Properties\)](#) on page 458
- [compression \(Voice Services\)](#) on page 459
- [compression-device](#) on page 459
- [connections](#) on page 460
- [connection-protection-tlv](#) on page 460
- [connectivity-fault-management](#) on page 461
- [container-devices](#) on page 463
- [container-list](#) on page 463
- [container-options](#) on page 464
- [container-type](#) on page 464

- [continuity-check](#) on page 465
- [control-channel](#) on page 466
- [control-polarity](#) on page 467
- [control-signal](#) on page 467
- [copy-tos-to-outer-ip-header](#) on page 468
- [core-dump](#) on page 468
- [crc-major-alarm-threshold](#) on page 469
- [crc-minor-alarm-threshold](#) on page 470
- [cts](#) on page 471
- [cts-polarity](#) on page 471
- [cycle-time](#) on page 472
- [damping \(Interfaces\)](#) on page 473
- [data-channel](#) on page 475
- [data-tlv-size](#) on page 476
- [dcd](#) on page 477
- [dcd-polarity](#) on page 477
- [dce](#) on page 478
- [default-actions](#) on page 478
- [default-chap-secret](#) on page 479
- [default-pap-password](#) on page 479
- [delimiter](#) on page 480
- [demux-destination \(Underlying Interface\)](#) on page 480
- [demux-destination \(Demux Interface\)](#) on page 481
- [demux-options \(Static Interface\)](#) on page 481
- [demux-source \(Demux Interface\)](#) on page 482
- [demux-source \(Underlying Interface\)](#) on page 483
- [demux0 \(Static Interface\)](#) on page 484
- [demux0 \(Dynamic Interface\)](#) on page 485
- [description](#) on page 486
- [destination \(IPCP\)](#) on page 487
- [destination \(Routing Instance\)](#) on page 487
- [destination \(Tunnels\)](#) on page 488
- [destination-class-usage](#) on page 489
- [destination-profile](#) on page 489
- [dial-options](#) on page 490
- [dialer](#) on page 491
- [dialer-options](#) on page 492

- [direction](#) on page 493
- [disable \(Interface\)](#) on page 494
- [disable \(Link Protection\)](#) on page 495
- [disable-mlppp-inner-ppp-pfc](#) on page 495
- [dlci](#) on page 496
- [do-not-fragment](#) on page 497
- [domain-name](#) on page 497
- [dot1x](#) on page 498
- [down-count](#) on page 499
- [drop \(PPPoE Service Name Tables\)](#) on page 500
- [drop-timeout](#) on page 500
- [ds0-options](#) on page 501
- [dsr](#) on page 502
- [dsr-polarity](#) on page 502
- [dte-options](#) on page 503
- [dtr](#) on page 504
- [dtr-circuit](#) on page 505
- [dtr-polarity](#) on page 505
- [dump-on-flow-control](#) on page 506
- [dynamic-profile \(PPP\)](#) on page 506
- [dynamic-profile \(PPPoE Service Name Tables\)](#) on page 507
- [dynamic-profile \(Stacked VLAN\)](#) on page 508
- [dynamic-profile \(VLAN\)](#) on page 509
- [dynamic-profiles](#) on page 510
- [e1-options](#) on page 517
- [e3-options](#) on page 518
- [east-interface](#) on page 519
- [egress-policer-overhead](#) on page 520
- [encapsulation \(Container Interface\)](#) on page 521
- [encapsulation \(Logical Interface\)](#) on page 522
- [encapsulation \(Physical Interface\)](#) on page 526
- [encoding](#) on page 530
- [epd-threshold \(Logical Interface\)](#) on page 531
- [epd-threshold \(Physical Interface\)](#) on page 532
- [es-options](#) on page 532
- [ethernet \(Protocols OAM\)](#) on page 533
- [ethernet-policer-profile](#) on page 536

- [ethernet-ring](#) on page 537
- [ethernet-switch-profile](#) on page 538
- [eui-64](#) on page 539
- [evcs](#) on page 540
- [event \(LFM\)](#) on page 541
- [event-thresholds](#) on page 541
- [fast-aps-switch](#) on page 542
- [facility-override](#) on page 543
- [failover-delay](#) on page 543
- [family \(Dynamic Standard Interface\)](#) on page 544
- [family](#) on page 546
- [fastether-options](#) on page 550
- [fcs](#) on page 551
- [feac-loop-respond](#) on page 552
- [filter](#) on page 553
- [filter \(Applying to an Interface\)](#) on page 554
- [flexible-vlan-tagging](#) on page 555
- [flow-control](#) on page 556
- [flow-control-options](#) on page 557
- [force](#) on page 558
- [forward-and-send-to-re](#) on page 558
- [forwarding-class \(ATM2 IQ Scheduler Maps\)](#) on page 559
- [forwarding-class \(Gigabit Ethernet IQ Classifier\)](#) on page 559
- [forward-only](#) on page 560
- [fragment-threshold](#) on page 560
- [frame-error](#) on page 561
- [frame-period](#) on page 562
- [frame-period-summary](#) on page 563
- [framing \(E1, E3, and T1 Interfaces\)](#) on page 564
- [framing \(10-Gigabit Ethernet Interfaces\)](#) on page 565
- [framing \(SONET and SDH Interfaces\)](#) on page 566
- [gigether-options](#) on page 567
- [gratuitous-arp-reply](#) on page 568
- [guard-interval](#) on page 569
- [hardware-assisted-timestamping](#) on page 570
- [high-plp-threshold](#) on page 571
- [hello-timer](#) on page 571



- [hierarchical-policer](#) on page 572
- [hierarchical-scheduler \(Subscriber Interfaces on MX Series Routers\)](#) on page 573
- [high-plp-max-threshold](#) on page 574
- [high-plp-threshold](#) on page 575
- [hold-interval \(OAM\)](#) on page 575
- [hold-interval \(Protection Group\)](#) on page 576
- [hold-time \(APS\)](#) on page 576
- [hold-time \(Physical Interface\)](#) on page 577
- [hold-time \(SONET/SDH Defect Triggers\)](#) on page 579
- [host \(Interfaces\)](#) on page 580
- [iccp](#) on page 581
- [idle-cycle-flag](#) on page 582
- [ieee802.1p](#) on page 583
- [if-exceeding](#) on page 583
- [igmp-snooping](#) on page 584
- [ignore](#) on page 585
- [ignore-all](#) on page 586
- [ignore-l3-incompletes](#) on page 586
- [ilmi](#) on page 587
- [ima-group-options](#) on page 588
- [ima-link-options](#) on page 590
- [inactivity-timeout](#) on page 590
- [indication](#) on page 591
- [indication-polarity](#) on page 591
- [ingress-policer-overhead](#) on page 592
- [ingress-rate-limit](#) on page 593
- [inner-tag-protocol-id](#) on page 594
- [inner-vlan-id](#) on page 595
- [inner-vlan-id-range](#) on page 596
- [input](#) on page 596
- [input-list](#) on page 597
- [input-policer](#) on page 598
- [input-priority-map](#) on page 599
- [input-three-color](#) on page 600
- [input-vlan-map \(Aggregated Ethernet\)](#) on page 601
- [input-vlan-map](#) on page 602
- [instance](#) on page 603

- [interface \(Hierarchical CoS Schedulers\)](#) on page 603
- [interface \(IEEE 802.1x\)](#) on page 604
- [interface \(IEEE 802.1ag OAM Connectivity-Fault Management\)](#) on page 605
- [interface \(OAM Link-Fault Management\)](#) on page 606
- [interface \(Port Mirroring\)](#) on page 607
- [interface-down](#) on page 607
- [interface-name](#) on page 608
- [interface-none](#) on page 608
- [interface-range](#) on page 609
- [interface-transmit-statistics](#) on page 610
- [interface-set \(Ethernet Interfaces\)](#) on page 610
- [interface-set \(IP Demux Interfaces\)](#) on page 611
- [interface-shared-with](#) on page 611
- [interface-status-tlv](#) on page 612
- [interface-switch](#) on page 613
- [interface-type \(Interfaces\)](#) on page 614
- [interfaces](#) on page 615
- [interfaces \(Static and Dynamic Subscribers\)](#) on page 616
- [interleave-fragments](#) on page 620
- [interval](#) on page 620
- [inverse-arp](#) on page 621
- [invert-data](#) on page 622
- [ipsec-sa](#) on page 623
- [iteration-count](#) on page 623
- [iteration-period](#) on page 624
- [keep-address-and-control](#) on page 624
- [keepalives](#) on page 625
- [key](#) on page 626
- [l2tp-interface-id](#) on page 626
- [lACP \(Protocols\)](#) on page 627
- [lACP \(802.3ad\)](#) on page 628
- [lACP \(Aggregated Ethernet\)](#) on page 629
- [layer2-policer](#) on page 631
- [lcp-max-conf-req](#) on page 632
- [lcp-restart-timer](#) on page 632
- [level](#) on page 633
- [line-encoding](#) on page 634

- [line-protocol](#) on page 635
- [linear-red-profile](#) on page 636
- [linear-red-profiles](#) on page 637
- [link-adjacency-loss](#) on page 637
- [link-discovery](#) on page 638
- [link-down](#) on page 638
- [link-event-rate](#) on page 639
- [link-fault-management](#) on page 640
- [link-layer-overhead](#) on page 641
- [link-mode](#) on page 642
- [link-protection](#) on page 643
- [link-speed \(Aggregated Ethernet\)](#) on page 644
- [link-speed \(Aggregated SONET/SDH\)](#) on page 646
- [linktrace](#) on page 647
- [lmi \(Frame Relay\)](#) on page 648
- [lmi \(Ethernet OAM\)](#) on page 650
- [lmi-type](#) on page 651
- [local-name](#) on page 652
- [local-password](#) on page 653
- [lockout](#) on page 653
- [log-prefix \(Interfaces\)](#) on page 654
- [logical-interface-fpc-redundancy \(Aggregated Ethernet Subscriber Interfaces\)](#) on page 654
- [logical-interface-policer](#) on page 655
- [logical-systems](#) on page 656
- [long-buildout](#) on page 656
- [loop-timing](#) on page 657
- [loopback \(ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3\)](#) on page 658
- [loopback \(Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet\)](#) on page 660
- [loopback \(Serial\)](#) on page 661
- [loopback-clear-timer](#) on page 662
- [loss-priority](#) on page 662
- [loss-threshold](#) on page 663
- [low-plp-max-threshold](#) on page 663
- [low-plp-threshold](#) on page 664
- [lowest-priority-defect](#) on page 665
- [lsq-failure-options](#) on page 666

- [mac](#) on page 666
- [mac-address \(Accept Source Mac\)](#) on page 667
- [mac-address \(VLAN and Stacked VLAN Interfaces\)](#) on page 667
- [mac-learn-enable](#) on page 668
- [mac-validate](#) on page 669
- [maintenance-association](#) on page 670
- [maintenance-domain](#) on page 671
- [master-only](#) on page 672
- [maximum-contexts](#) on page 673
- [maximum-requests](#) on page 673
- [maximum-vcs](#) on page 674
- [mc-ae](#) on page 675
- [member-interface-speed](#) on page 677
- [member-interface-type](#) on page 678
- [mep](#) on page 679
- [minimum-links](#) on page 680
- [mip-half-function](#) on page 681
- [mlfr-uni-nni-bundle-options](#) on page 682
- [mode \(Dynamic Profiles\)](#) on page 683
- [mode \(Interfaces\)](#) on page 683
- [monitor-session](#) on page 684
- [mpls \(Interfaces\)](#) on page 684
- [mtu](#) on page 685
- [multi-chassis-protection](#) on page 689
- [multicast-dlci](#) on page 690
- [multicast-only](#) on page 690
- [multicast-statistics](#) on page 691
- [multicast-vci](#) on page 692
- [multilink-max-classes](#) on page 693
- [multipoint](#) on page 693
- [multipoint-destination](#) on page 694
- [multiservice-options](#) on page 695
- [n391](#) on page 696
- [n392](#) on page 697
- [n393](#) on page 698
- [name-format](#) on page 699
- [native-vlan-id](#) on page 700

- [ncp-max-conf-req](#) on page 701
- [ncp-restart-timer](#) on page 702
- [nd6-stale-time](#) on page 703
- [negotiate-address](#) on page 704
- [negotiation-options](#) on page 704
- [neighbor \(Automatic Protection Switching for SONET/SDH\)](#) on page 705
- [no-allow-link-events](#) on page 705
- [no-aggregate-delegate-processing](#) on page 706
- [asynchronous-notification](#) on page 707
- [no-auto-mdix](#) on page 708
- [auto-negotiation](#) on page 709
- [cbit-parity](#) on page 710
- [core-dump](#) on page 711
- [feac-loop-respond](#) on page 712
- [flow-control](#) on page 713
- [gratuitous-arp-reply](#) on page 714
- [no-gratuitous-arp-request](#) on page 714
- [no-keepalives](#) on page 715
- [long-buildout](#) on page 716
- [loopback \(Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet\)](#) on page 717
- [mac-learn-enable](#) on page 718
- [no-partition](#) on page 719
- [payload-scrambler](#) on page 721
- [no-pre-classifier](#) on page 722
- [no-redirects](#) on page 723
- [source-filtering](#) on page 724
- [syslog \(Monitoring\)](#) on page 725
- [no-termination-request](#) on page 725
- [translate-discard-eligible](#) on page 726
- [translate-fecn-and-becn](#) on page 726
- [unframed](#) on page 727
- [z0-increment](#) on page 727
- [node-id](#) on page 728
- [non-revertive \(Interfaces\)](#) on page 728
- [oam](#) on page 729
- [oam-liveness](#) on page 732
- [oam-period](#) on page 733

- [oc-slice on page 734](#)
- [open-timeout on page 734](#)
- [optics-options on page 735](#)
- [option-82 on page 736](#)
- [otn-options on page 737](#)
- [output on page 738](#)
- [output-list on page 739](#)
- [output-policer on page 740](#)
- [output-priority-map on page 741](#)
- [output-three-color on page 742](#)
- [output-vlan-map \(Aggregated Ethernet\) on page 743](#)
- [output-vlan-map \(Gigabit Ethernet IQ and 10-Gigabit Ethernet with SFPP\) on page 744](#)
- [overflow \(Receive Bucket\) on page 744](#)
- [overflow \(Transmit Bucket\) on page 745](#)
- [override on page 745](#)
- [pado-advertise on page 746](#)
- [paired-group on page 746](#)
- [pap on page 747](#)
- [pap-password on page 748](#)
- [partition on page 749](#)
- [passive \(CHAP\) on page 750](#)
- [passive \(PAP\) on page 750](#)
- [passive-monitor-mode on page 751](#)
- [password \(Interfaces\) on page 752](#)
- [path-database-size on page 752](#)
- [path-trace on page 753](#)
- [payload-scrambler on page 754](#)
- [payload-size on page 755](#)
- [pdu-interval on page 755](#)
- [pdu-threshold on page 756](#)
- [peer on page 757](#)
- [peer-unit on page 758](#)
- [per-unit-scheduler on page 759](#)
- [performance-monitoring on page 761](#)
- [periodic on page 762](#)
- [pfc on page 762](#)
- [pic-type on page 763](#)

- [plp-to-clp](#) on page 763
- [plp1](#) on page 764
- [point-to-point](#) on page 765
- [policer \(CFM Firewall\)](#) on page 765
- [policer \(CFM Global\)](#) on page 766
- [policer \(CFM Session\)](#) on page 767
- [policer \(CoS\)](#) on page 768
- [policer \(Interface\)](#) on page 769
- [policer \(MAC\)](#) on page 770
- [policy-statement](#) on page 771
- [pop](#) on page 775
- [pop-all-labels](#) on page 776
- [pop-pop](#) on page 777
- [pop-swap](#) on page 778
- [port](#) on page 779
- [port-priority](#) on page 779
- [port-status-tlv](#) on page 780
- [post-service-filter](#) on page 780
- [ppp-options](#) on page 781
- [pppoe-options](#) on page 782
- [pppoe-underlying-options \(Static and Dynamic Subscribers\)](#) on page 783
- [preferred](#) on page 784
- [preferred-source-address](#) on page 785
- [premium \(Hierarchical Policer\)](#) on page 786
- [premium \(Output Priority Map\)](#) on page 787
- [premium \(Policer\)](#) on page 787
- [preserve-interface](#) on page 788
- [primary \(Address on Interface\)](#) on page 789
- [primary \(AS PIC or Multiservices PIC Interfaces\)](#) on page 789
- [priority \(OAM Connectivity-Fault Management\)](#) on page 790
- [priority \(Schedulers\)](#) on page 790
- [promiscuous-mode](#) on page 791
- [protect-circuit](#) on page 792
- [protection-group](#) on page 793
- [protocol-down](#) on page 795
- [protocols](#) on page 795
- [proxy](#) on page 796

- [proxy-arp on page 797](#)
- [push on page 798](#)
- [push-push on page 799](#)
- [queue-depth on page 800](#)
- [queue-length on page 801](#)
- [queues on page 801](#)
- [quiet-period on page 802](#)
- [radius-realm on page 802](#)
- [ranges \(Dynamic Stacked VLAN\) on page 803](#)
- [ranges \(Dynamic VLAN\) on page 803](#)
- [rate on page 804](#)
- [rate on page 804](#)
- [rdi on page 805](#)
- [reassemble-packets on page 805](#)
- [reauthentication on page 806](#)
- [receive-bucket on page 807](#)
- [receive-options-packets on page 807](#)
- [receive-ttl-exceeded on page 808](#)
- [red-differential-delay on page 808](#)
- [redundancy-options on page 809](#)
- [remote on page 810](#)
- [remote-loopback on page 810](#)
- [remote-loopback-respond on page 811](#)
- [remote-mep on page 812](#)
- [remove-when-no-subscribers on page 812](#)
- [request on page 813](#)
- [required-depth on page 814](#)
- [restore-interval on page 815](#)
- [retries on page 816](#)
- [revert-time \(Interfaces\) on page 816](#)
- [revertive on page 817](#)
- [rfc-2615 on page 817](#)
- [ring-protection-link-end on page 818](#)
- [ring-protection-link-owner on page 818](#)
- [routing-instance on page 819](#)
- [routing-instance \(PPPoE Service Name Tables\) on page 820](#)
- [rpf-check \(Dynamic Profiles\) on page 821](#)



- [rpf-check \(interfaces\) on page 822](#)
- [rpf-loose-mode-discard on page 823](#)
- [rtp on page 823](#)
- [rts on page 824](#)
- [rts-polarity on page 824](#)
- [rtvbr on page 825](#)
- [sa-multicast \(100-Gigabit Ethernet\) on page 827](#)
- [sampling \(Interfaces\) on page 828](#)
- [satop-options on page 829](#)
- [shared-interface on page 830](#)
- [scheduler-maps \(For ATM2 IQ Interfaces\) on page 831](#)
- [schedulers on page 831](#)
- [secondary on page 832](#)
- [send-critical-event on page 832](#)
- [serial-options on page 833](#)
- [server on page 834](#)
- [server-timeout on page 834](#)
- [service \(Logical Interfaces\) on page 835](#)
- [service \(PPPoE\) on page 836](#)
- [service-domain on page 837](#)
- [service-filter \(Interfaces\) on page 838](#)
- [service-name-table on page 839](#)
- [service-name-tables on page 840](#)
- [service-set on page 841](#)
- [services \(Priority Level\) on page 842](#)
- [services-options on page 843](#)
- [shaping on page 844](#)
- [short-name-format on page 845](#)
- [short-sequence on page 846](#)
- [sla-iterator-profile on page 847](#)
- [sla-iterator-profiles on page 848](#)
- [sonet-options on page 849](#)
- [source on page 851](#)
- [source-address-filter on page 852](#)
- [source-class-usage on page 853](#)
- [source-filtering on page 854](#)
- [speed \(Ethernet\) on page 855](#)

- [speed \(MX Series DPC\) on page 856](#)
- [speed \(SONET/SDH\) on page 857](#)
- [spid1 on page 857](#)
- [spid2 on page 858](#)
- [stacked-vlan-ranges on page 859](#)
- [stacked-vlan-tagging on page 860](#)
- [start-end-flag on page 861](#)
- [static-interface on page 862](#)
- [supplicant on page 863](#)
- [supplicant-timeout on page 864](#)
- [swap on page 865](#)
- [swap-push on page 866](#)
- [swap-swap on page 867](#)
- [switch-options on page 867](#)
- [switch-port on page 868](#)
- [switching-mode on page 868](#)
- [symbol-period on page 869](#)
- [syslog \(Interfaces\) on page 870](#)
- [syslog \(Monitoring\) on page 870](#)
- [syslog \(OAM Action\) on page 871](#)
- [system-priority on page 871](#)
- [t1-options on page 872](#)
- [t310 on page 873](#)
- [t391 on page 873](#)
- [t392 on page 874](#)
- [t3-options on page 875](#)
- [tag-protocol-id \(TPIDs Expected to Be Sent or Received\) on page 876](#)
- [tag-protocol-id \(TPID to Rewrite\) on page 877](#)
- [targeted-broadcast on page 878](#)
- [targeted-distribution \(Static Interfaces over Aggregated Ethernet\) on page 879](#)
- [tei-option on page 879](#)
- [terminate \(PPPoE Service Name Tables\) on page 880](#)
- [then on page 880](#)
- [threshold on page 881](#)
- [timeslots on page 882](#)
- [tm on page 883](#)
- [tm-polarity on page 883](#)

- [traceoptions \(Individual Interfaces\) on page 884](#)
- [traceoptions \(Interface Process\) on page 886](#)
- [traceoptions \(LACP\) on page 888](#)
- [traceoptions \(PPP Process\) on page 890](#)
- [traceoptions \(PPPoE\) on page 893](#)
- [translate-discard-eligible on page 895](#)
- [translate-fecn-and-becn on page 896](#)
- [translate-plp-control-word-de on page 896](#)
- [transmit-bucket on page 897](#)
- [transmit-clock on page 897](#)
- [transmit-period on page 898](#)
- [transmit-weight \(ATM2 IQ CoS Forwarding Class\) on page 899](#)
- [transmit-weight \(ATM2 IQ Virtual Circuit\) on page 900](#)
- [traps on page 901](#)
- [trigger on page 902](#)
- [trigger-link-failure on page 903](#)
- [trunk-bandwidth on page 903](#)
- [trunk-id on page 904](#)
- [ttl on page 904](#)
- [tunnel on page 905](#)
- [underlying-interface on page 906](#)
- [unframed on page 907](#)
- [unidirectional on page 907](#)
- [unit \(Dynamic Profiles Standard Interface\) on page 908](#)
- [unit on page 911](#)
- [unnumbered-address \(Demux\) on page 917](#)
- [unnumbered-address \(Dynamic Profiles\) on page 918](#)
- [unnumbered-address \(Ethernet\) on page 920](#)
- [unnumbered-address \(PPP\) on page 921](#)
- [up-count on page 922](#)
- [user-prefix on page 923](#)
- [username-include on page 924](#)
- [vbr on page 925](#)
- [vc-cos-mode on page 926](#)
- [vci on page 927](#)
- [vci-range on page 928](#)
- [virtual-switch on page 928](#)

- [vlan-id \(Logical Port in Bridge Domain\) on page 929](#)
- [vlan-id \(Outer VLAN ID\) on page 929](#)
- [vlan-id \(VLAN ID to Be Bound to a Logical Interface\) on page 930](#)
- [vlan-id \(VLAN ID to Rewrite\) on page 931](#)
- [vlan-id-list \(Ethernet VLAN Circuit\) on page 932](#)
- [vlan-id-list \(Interface in Bridge Domain\) on page 934](#)
- [vlan-id-range on page 935](#)
- [vlan-ranges on page 936](#)
- [vlan-rewrite on page 937](#)
- [vlan-rule \(100-Gigabit Ethernet Type 4 PIC with CFP\) on page 938](#)
- [vlan-steering \(100-Gigabit Ethernet Type 4 PIC with CFP\) on page 939](#)
- [vlan-tagging on page 940](#)
- [vlan-tags \(Dual-Tagged Logical Interface\) on page 941](#)
- [vlan-tags \(Stacked VLAN Tags\) on page 943](#)
- [vlan-tags-outer on page 944](#)
- [vlan-vci-tagging on page 944](#)
- [vpi \(ATM CCC Cell-Relay Promiscuous Mode\) on page 945](#)
- [vpi \(Define Virtual Path\) on page 946](#)
- [vpi \(Logical Interface and Interworking\) on page 947](#)
- [vtmapping on page 947](#)
- [warning on page 948](#)
- [wavelength on page 949](#)
- [west-interface on page 953](#)
- [working-circuit on page 954](#)
- [yellow-differential-delay on page 954](#)
- [z0-increment on page 955](#)

## [\[edit chassis\] Hierarchy Level](#)

---

```
chassis {
 aggregated-devices {
 ethernet {
 device-count number;
 }
 sonet {
 device-count number;
 }
 }
 maximum-links {
 }
 channel-group number {
 ethernet {
 device-count number;
 }
 }
}
```

```

}
fpc slot-number{
 pic pic-number {
 adaptive-services{
 service-package (layer-2 | layer-3);
 }
 aggregate-ports;
 atm-cell-relay-accumulation;
 atm-l2circuit-mode (aal5 | cell | trunk trunk);
 cel {
 el link-number {
 channel-group group-number;
 timeslots time-slot-range;
 }
 }
 channelization;
 ct1 {
 t1 link-number {
 channel-group group-number;
 timeslots time-slot-range;
 }
 }
 ct3 {
 port port-number {
 t1 link-number {
 channel-group group-number;
 timeslots time-slot-range;
 }
 }
 framing sdh;
 }
 max-queues-per-interface number;
 mlfr-uni-nni-bundles num-intf;
 no-concatenate;
 shdsl {
 pic-mode (1-port-atm | 2-port-atm);
 }
 vtmapping (klm | itu-t);
 }
}
fpc slot-number{
 pic pic-number{
 account-layer2-overhead
 egress-policer-overhead bytes;
 ingress-policer-overhead bytes;
 mlfr-uni-nni-bundles-inline number;
 multi-link-layer-2-inline;
 }
}
}

```

**Related Documentation**

- *Interfaces Fundamentals for Routing Devices*

## [edit interfaces] Hierarchy Level

The statements at the [edit interfaces *interface-name* unit *logical-unit-number*] hierarchy level can also be configured at the [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*] hierarchy level.



**NOTE:** The **accounting-profile** statement is an exception to this rule. The **accounting-profile** statement can be configured at the [edit interfaces *interface-name* unit *logical-unit-number*] hierarchy level, but it cannot be configured at the [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*] hierarchy level.

```

interfaces {
 traceoptions {
 file filename <files number> <match regular-expression> <size size> <world-readable |
 no-world-readable> ;
 flag flag <disable>;
 }
 interface-name {
 accounting-profile name;
 aggregated-ether-options {
 (flow-control | no-flow-control);
 lacp {
 (active | passive);
 link-protection {
 disable;
 }
 (revertive | non-revertive);
 periodic interval;
 system-priority priority;
 }
 link-protection;
 link-speed speed;
 (loopback | no-loopback);
 mc-ae {
 chassis-id chassis-id;
 mc-ae-id mc-ae-id;
 mode (active-active | active-standby);
 redundancy-group group-id;
 status-control (active | standby);
 }
 minimum-links number;
 source-address-filter {
 mac-address;
 }
 (source-filtering | no-source-filtering);
 }
 shared-scheduler;
 aggregated-sonet-options {
 link-speed speed | mixed;
 minimum-links number;
 }
 }
}

```

```

atm-options {
 cell-bundle-size cells;
 ilmi;
 linear-red-profiles profile-name {
 high-plp-max-threshold percent;
 low-plp-max-threshold percent;
 queue-depth cells high-plp-threshold percent low-plp-threshold percent;
 }
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
 pic-type (atm1 | atm2);
 plp-to-clp;
 promiscuous-mode {
 vpi vpi-identifier;
 }
 scheduler-maps map-name {
 forwarding-class class-name {
 epd-threshold cells plp1 cells;
 linear-red-profile profile-name;
 priority (high | low);
 transmit-weight (cells number | percent number);
 }
 vc-cos-mode (alternate | strict);
 }
 use-null-cw;
 vpi vpi-identifier {
 maximum-vcs maximum-vcs;
 oam-liveness {
 down-count cells;
 up-count cells;
 }
 oam-period (seconds | disable);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
 burst length);
 queue-length number;
 }
 }
}
clocking clock-source;
damping {
 enable;
 half-life seconds;
 max-suppress seconds;
 reuse number;
 suppress number;
}
data-input (system | interface interface-name);
dce;
serial-options {
 clock-rate rate;
 clocking-mode (dce | internal | loop);
 control-polarity (negative | positive);
}

```

```
cts-polarity (negative | positive);
dcd-polarity (negative | positive);
dce-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
dsr-polarity (negative | positive);
dte-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
description text;
alias alias-name;
dialer-options {
 pool pool-name <priority priority>;
}
disable;
ds0-options {
 bert-algorithm algorithm;
 bert-error-rate rate;
 bert-period seconds;
 byte-encoding (nx56 | nx64);
 fcs (16 | 32);
 idle-cycle-flag (flags | ones);
 invert-data;
 loopback payload;
 start-end-flag (filler | shared);
}
el-options {
 bert-error-rate rate;
 bert-period seconds;
 fcs (16 | 32);
```



```

 framing (g704 | g704-no-crc4 | unframed);
 idle-cycle-flag (flags | ones);
 invert-data;
 loopback (local | remote);
 start-end-flag (filler | shared);
 timeslots time-slot-range;
}
e3-options {
 atm-encapsulation (direct | plcp);
 bert-algorithm algorithm;
 bert-error-rate rate;
 bert-period seconds;
 framing feet;
 compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
 fcs (16 | 32);
 framing (g.751 | g.832);
 idle-cycle-flag (filler | shared);
 invert-data;
 loopback (local | remote);
 (payload-scrambler | no-payload-scrambler);
 start-end-flag (filler | shared);
 (unframed | no-unframed);
}
encapsulation type;
es-options {
 backup-interface es-fpc/pic/port;
}
fastether-options {
 802.3ad aex;
 (flow-control | no-flow-control);
 ignore-l3-incompletes;
 ingress-rate-limit rate;
 (loopback | no-loopback);
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
 source-address-filter {
 mac-address;
 }
 (source-filtering | no-source-filtering);
}
flexible-vlan-tagging;
gigether-options {
 802.3ad aex;
 (asynchronous-notification | no-asynchronous-notification);
 (auto-negotiation | no-auto-negotiation) remote-fault <local-interface-online |
 local-interface-offline>;
 auto-reconnect seconds;
 (flow-control | no-flow-control);
 ignore-l3-incompletes;
 (loopback | no-loopback);
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
}

```

```

 }
 }
 no-auto-mdix;
 source-address-filter {
 mac-address;
 }
 (source-filtering | no-source-filtering);
 ethernet-switch-profile {
 (mac-learn-enable | no-mac-learn-enable);
 tag-protocol-id [tpids];
 ethernet-policer-profile {
 input-priority-map {
 ieee802.1p premium [values];
 }
 output-priority-map {
 classifier {
 premium {
 forwarding-class class-name {
 loss-priority (high | low);
 }
 }
 }
 }
 }
 policer cos-policer-name {
 aggregate {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 premium {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 }
 }
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time up milliseconds down milliseconds;
ima-group-options {
 differential-delay number;
 frame-length (32 | 64 | 128 | 256);
 frame-synchronization {
 alpha number;
 beta number;
 gamma number;
 }
 minimum-links number;
 symmetry (symmetrical-config-and-operation |
 symmetrical-config-asymmetrical-operation);
 test-procedure {
 ima-test-start;
 ima-test-stop;
 interface name;
 pattern number;
 period number;
 }
}

```

```

 transmit-clock (common | independent);
 version (1.0 | 1.1);
}
ima-link-options group-id group-id;
interface-set interface-set-name {
 interface ethernet-interface-name {
 (unit unit-number | vlan-tags-outer vlan-tag);
 }
 interface interface-name {
 (unit unit-number);
 }
}
isdn-options {
 bchannel-allocation (ascending | descending);
 calling-number number;
 pool pool-name <priority priority>;
 spid1 spid-string;
 spid2 spid-string;
 static-tei-val value;
 switch-type (att5e | etsi | ni1 | ntdms100 | ntt);
 t310 seconds;
 tei-option (first-call | power-up);
}
keepalives <down-count number> <interval seconds> <up-count number>;
link-mode mode;
lmi {
 lmi-type (ansi | itu | c-lmi);
 n391dte number;
 n392dce number;
 n392dte number;
 n393dce number;
 n393dte number;
 t391dte seconds;
 t392dce seconds;
}
lsq-failure-options {
 no-termination-request;
 [trigger-link-failure interface-name];
}
mac mac-address;
mlfr-uni-nni-bundle-options {
 acknowledge-retries number;
 acknowledge-timer milliseconds;
 action-red-differential-delay (disable-tx | remove-link);
 drop-timeout milliseconds;
 fragment-threshold bytes;
 cisco-interoperability send-lip-remove-link-for-link-reject;
 hello-timer milliseconds;
 link-layer-overhead percent;
 lmi-type (ansi | itu | c-lmi);
 minimum-links number;
 mrru bytes;
 n391 number;
 n392 number;
 n393 number;
 red-differential-delay milliseconds;

```

```

t391 seconds;
t392 seconds;
yellow-differential-delay milliseconds;
}
modem-options {
 dialin (console | routable);
 init-command-string initialization-command-string;
}
mtu bytes;
multi-chassis-protection {
 peer a.b.c.d {
 interface interface-name;
 }
}
multiservice-options {
 (core-dump | no-core-dump);
 (syslog | no-syslog);
}
native-vlan-id number;
no-gratuitous-arp-request;
no-keepalives;
no-partition {
 interface-type type;
}
no-vpivci-swapping;
otn-options {
 fec (efec | gfec | none);
 (laser-enable | no-laser-enable);
 (line-loopback | no-line-loopback);
 pass-thru;
 rate (fixed-stuff-bytes | no-fixed-stuff-bytes | pass-thru);
 transmit-payload-type number;
 trigger (oc-lof | oc-lom | oc-los | oc-wavelength-lock | odu-ais | odu-bbe-th | odu-bdi
 | odu-es-th | odu-lck | odu-oci | odu-sd | odu-ses-th | odu-ttim | odu-uas-th |
 opu-ptm | otu-ais | otu-bbe-th | otu-bdi | otu-es-th | otu-fec-deg | otu-fec-exe |
 otu-iae | otu-sd | otu-ses-th | otu-ttim | otu-uas-th);
 tti;
}
optics-options {
 wavelength nm;
 alarm alarm-name {
 (syslog | link-down);
 }
 warning warning-name {
 (syslog | link-down);
 }
}
partition partition-number oc-slice oc-slice-range interface-type type;
timeslots time-slot-range;
passive-monitor-mode;
per-unit-scheduler;
ppp-options {
 chap {
 access-profile name;
 default-chap-secret name;
 local-name name;
 }
}

```

```

 passive;
}
compression {
 acfc;
 pfc;
}
dynamic-profile profile-name;
no-termination-request;
pap {
 access-profile name;
 local-name name;
 local-password password;
 compression;
}
}
psn-vcip psn-vci-identifier;
psn-vpip psn-vpi-identifier;
receive-bucket {
 overflow (discard | tag);
 rate percentage;
 threshold bytes;
}
redundancy-options {
 priority sp-fpc/pic/port;
 secondary sp-fpc/pic/port;
 hot-standby;
}
satop-options {
 payload-size n;
}
schedulers number;
serial-options {
 clock-rate rate;
 clocking-mode (dce | internal | loop);
 control-polarity (negative | positive);
 cts-polarity (negative | positive);
 dcd-polarity (negative | positive);
 dce-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
 }
 dsr-polarity (negative | positive);
 dte-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 }
}

```

```
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
}
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
services-options {
 inactivity-timeout seconds;
 open-timeout seconds;
 session-limit {
 maximum number;
 rate new-sessions-per-second;
 }
 syslog {
 host hostname {
 facility-override facility-name;
 log-prefix prefix-number;
 services priority-level;
 }
 }
}
shdsl-options {
 annex (annex-a | annex-b);
 line-rate line-rate;
 loopback (local | remote);
 snr-margin {
 snext margin;
 }
}
sonet-options {
 aggregate asx;
 aps {
 advertise-interval milliseconds;
 annex-b;
 authentication-key key;
 fast-aps-switch;
 force;
 hold-time milliseconds;
 lockout;
 neighbor address;
 paired-group group-name;
 preserve-interface;
 protect-circuit group-name;
 request;
 revert-time seconds;
 switching-mode (bidirectional | unidirectional);
 working-circuit group-name;
 }
}
```

```

bytes {
 c2 value;
 e1-quiet value;
 f1 value;
 f2 value;
 s1 value;
 z3 value;
 z4 value;
}
fcs (16 | 32);
loopback (local | remote);
mpls {
 pop-all-labels {
 required-depth number;
 }
}
path-trace trace-string;
(payload-scrambler | no-payload-scrambler);
rfc-2615;
trigger {
 defect ignore;
 hold-time up milliseconds down milliseconds;
}
vtmapping (itu-t | klm);
(z0-increment | no-z0-increment);
}
speed (10m | 100m | 1g | oc3 | oc12 | oc48);
stacked-vlan-tagging;
switch-options {
 switch-port port-number {
 (auto-negotiation | no-auto-negotiation);
 speed (10m | 100m | 1g);
 link-mode (full-duplex | half-duplex);
 }
}
t1-options {
 bert-algorithm algorithm;
 bert-error-rate rate;
 bert-period seconds;
 buildout value;
 byte-encoding (nx56 | nx64);
 crc-major-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5);
 crc-minor-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5 | 5e-6 | 1e-6);
 fcs (16 | 32);
 framing (esf | sf);
 idle-cycle-flag (flags | ones);
 invert-data;
 line-encoding (ami | b8zs);
 loopback (local | payload | remote);
 remote-loopback-respond;
 start-end-flag (filler | shared);
 timeslots time-slot-range;
}
t3-options {
 atm-encapsulation (direct | plcp);
 bert-algorithm algorithm;

```

```

bert-error-rate rate;
bert-period seconds;
buildout feet;
(cbit-parity | no-cbit-parity);
compatibility-mode (adtran | digital-link | kentrox | larscom | verilink) <subrate
 value>;
fcs (16 | 32);
(feac-loop-respond | no-feac-loop-respond);
idle-cycle-flag value;
(long-buildout | no-long-buildout);
(loop-timing | no-loop-timing);
loopback (local | payload | remote);
(mac | no-mac);
(payload-scrambler | no-payload-scrambler);
start-end-flag (filler | shared);
}
traceoptions {
 flag flag <flag-modifier> <disable>;
}
transmit-bucket {
 overflow discard;
 rate percentage;
 threshold bytes;
}
(traps | no-traps);
unidirectional;
vlan-tagging;
vlan-vci-tagging;
unit logical-unit-number {
 accept-source-mac {
 mac-address mac-address {
 policer {
 input cos-policer-name;
 output cos-policer-name;
 }
 }
 }
}
accounting-profile name;
advisory-options {
 downstream-rate rate;
 upstream-rate rate;
}
allow-any-vci;
atm-scheduler-map (map-name | default);
backup-options {
 interface interface-name;
}
bandwidth rate;
cell-bundle-size cells;
clear-dont-fragment-bit;
compression {
 rtp {
 f-max-period number;
 maximum-contexts number <force>;
 queues [queue-numbers];
 port {

```



```

 minimum port-number;
 maximum port-number;
 }
}
compression-device interface-name;
copy-tos-to-outer-ip-header;
demux-destination family;
demux-source family;
demux-options {
 underlying-interface interface-name;
}
description text;
alias alias-name;
interface {
 l2tp-interface-id name;
 (dedicated | shared);
}
dialer-options {
 activation-delay seconds;
 callback;
 callback-wait-period time;
 deactivation-delay seconds;
 dial-string [dial-string-numbers];
 idle-timeout seconds;
 incoming-map {
 caller (caller-id | accept-all);
 initial-route-check seconds;
 load-interval seconds;
 load-threshold percent;
 pool pool-name;
 redial-delay time;
 watch-list {
 [routes];
 }
 }
}
disable;
disable-mlppp-inner-ppp-pfc;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
 activation-priority priority;
 bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold cells plp1 cells;
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
input-vlan-map {
 (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 tag-protocol-id tpid;
 vlan-id number;
}

```

```
interleave-fragments;
inverse-arp;
layer2-policer {
 input-policer policer-name;
 input-three-color policer-name;
 output-policer policer-name;
 output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
 down-count cells;
 up-count cells;
}
oam-period (seconds | disable);
output-vlan-map {
 (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 tag-protocol-id tpid;
 vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
 chap {
 access-profile name;
 default-chap-secret name;
 local-name name;
 passive;
 }
 compression {
 acfc;
 pfc;
 pap;
 default-pap-password password;
 local-name name;
 local-password password;
 passive;
 }
 dynamic-profile profile-name;
 lcp-max-conf-req number;
 lcp-restart-timer milliseconds;
 loopback-clear-timer seconds;
 ncp-max-conf-req number;
 ncp-restart-timer milliseconds;
}
pppoe-options {
 access-concentrator name;
```

```

auto-reconnect seconds;
(client | server);
service-name name;
underlying-interface interface-name;
}
proxy-arp;
service-domain (inside | outside);
shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
 burst length);
 queue-length number;
}
short-sequence;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
 backup-destination address;
 destination address;
 key number;
 routing-instance {
 destination routing-instance-name;
 }
 source source-address;
 ttl number;
}
vci vpi-identifier.vci-identifier;
vci-range start start-vci end end-vci;
vpi vpi-identifier;
vlan-id number;
vlan-id-list [vlan-id vlan-id-vlan-id];
vlan-id-range number-number;
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
vlan-tags-outer tpid.vlan-id inner-list [vlan-id vlan-id-vlan-id];
family family {
 accounting {
 destination-class-usage;
 source-class-usage {
 direction;
 }
 }
}
access-concentrator name;
address address {
 destination address;
}
bundle ml-fpc/pic/port | ls-fpc/pic/port;
direct-connect;
duplicate-protection;
dynamic-profile profile-name;
filter {
 group filter-group-number;
 input filter-name;
 input-list {
 [filter-names];
 }
 output filter-name;
}

```

```

 }
 output-list {
 [filter-names];
 }
}
ipsec-sa sa-name;
keep-address-and-control;
max-sessions number;
max-sessions-vsa-ignore;
mtu bytes;
multicast-only;
negotiate-address;
no-redirects;
policer {
 arp policer-template-name;
 input policer-template-name;
 output policer-template-name;
}
primary;
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check {
 fail-filter filter-name;
 mode loose;
}
sampling {
 direction;
}
service {
 input {
 service-set service-set-name <service-filter filter-name>;
 post-service-filter filter-name;
 }
 output {
 service-set service-set-names <service-filter filter-name>;
 }
}
service-name-table table-name;
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
 maximum-seconds>;
targeted-broadcast {
 forward-and-send-to-re;
 forward-only;
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name <destination address destination-profile
 profile-name | preferred-source-address address>;
address address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 destination address;
 destination-profile name;
}

```

```

eui-64;
multipoint-destination address (dlci dlci-identifier | vci vci-identifier);
multipoint-destination address {
 epd-threshold cells plp1 cells;
 inverse-arp;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 oam-period (seconds | disable);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
 rate burst length);
 queue-length number;
 }
 vci vpi-identifier.vci-identifier;
}
preferred;
primary;
(vrrp-group | vrrp-inet6-group) group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-type authentication;
 authentication-key key;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority-number number;
 track {
 priority-cost seconds;
 priority-hold-time interface-name {
 bandwidth-threshold bits-per-second {
 priority;
 }
 interface priority;
 }
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 virtual-address [addresses];
}
}
}
}
}
}
}

```

#### Related Documentation

- [Junos OS Hierarchy and RFC Reference](#)
- [Ethernet Interfaces Feature Guide for Routing Devices](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

## [edit logical-systems] Hierarchy Level

---

The following lists the statements that can be configured at the **[edit logical-systems]** hierarchy level that are also documented in this manual. For more information about logical systems, see the *Logical Systems Feature Guide for Routing Devices*.

```
logical-systems logical-system-name {
 interfaces interface-name {
 unit logical-unit-number {
 accept-source-mac {
 mac-address mac-address {
 policer {
 input cos-policer-name;
 output cos-policer-name;
 }
 }
 }
 }
 allow-any-vci;
 atm-scheduler-map (map-name | default);
 bandwidth rate;
 backup-options {
 interface interface-name;
 }
 cell-bundle-size cells;
 clear-dont-fragment-bit;
 compression {
 rtp {
 f-max-period number;
 port {
 minimum port-number;
 maximum port-number;
 }
 }
 queues [queue-numbers];
 }
 }
 compression-device interface-name;
 description text;
 interface {
 l2tp-interface-id name;
 (dedicated | shared);
 }
 dialer-options {
 activation-delay seconds;
 deactivation-delay seconds;
 dial-string [dial-string-numbers];
 idle-timeout seconds;
 initial-route-check seconds;
 load-threshold number;
 pool pool;
 remote-name remote-callers;
 watch-list {
 [routes];
 }
 }
}
```

```

disable;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
 activation-priority priority;
 bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold cells plp1 cells;
fragment-threshold bytes;
input-vlan-map {
 inner-tag-protocol-id;
 inner-vlan-id;
 (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
 tag-protocol-id tpid;
 vlan-id number;
}
interleave-fragments;
inverse-arp;
layer2-policer {
 input-policer policer-name;
 input-three-color policer-name;
 output-policer policer-name;
 output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
 up-count cells;
 down-count cells;
}
oam-period (seconds | disable);
output-vlan-map {
 inner-tag-protocol-id;
 inner-vlan-id;
 (pop | pop-pop | pop-swap | push | push-push | swap | swap-swap);
 tag-protocol-id tpid;
 vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
 chap {
 access-profile name;
 default-chap-secret name;
 local-name name;
 passive;
 }
 compression {

```

```
 acfc;
 pfc;
 }
}
dynamic-profile profile-name;
pap {
 default-pap-password password;
 local-name name;
 local-password password;
 passive;
}
}
proxy-arp;
service-domain (inside | outside);
shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst length);
 queue-length number;
}
short-sequence;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
 backup-destination address;
 destination address;
 key number;
 routing-instance {
 destination routing-instance-name;
 }
 source source-address;
 ttl number;
}
vci vpi-identifier.vci-identifier;
vlan-id number;
vlan-id-list [vlan-id vlan-id–vlan-id]
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
vlan-tags outer tpid.vlan-id inner-list [vlan-id vlan-id–vlan-id]
vpi vpi-identifier;
family family {
 accounting {
 destination-class-usage;
 source-class-usage {
 direction;
 }
 }
}
bundle interface-name;
filter {
 group filter-group-number;
 input filter-name;
 input-list {
 [filter-names];
 }
 output filter-name;
 output-list {
```



```

 [filter-names];
 }
}
ipsec-sa sa-name;
keep-address-and-control;
mtu bytes;
multicast-only;
no-redirects;
policer {
 arp policer-template-name;
 input policer-template-name;
 output policer-template-name;
}
primary;
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check <fail-filter filter-name> {
 <mode loose>;
}
sampling {
 direction;
}
service {
 input {
 service-set service-set-name <service-filter filter-name>;
 post-service-filter filter-name;
 }
 output {
 service-set service-set-name <service-filter filter-name>;
 }
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
unnumbered-address interface-name destination address destination-profile
profile-name;
address address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 destination address;
 destination-profile name;
 eui-64;
 multipoint-destination address (dlci dlci-identifier | vci vci-identifier);
 multipoint-destination address {
 epd-threshold cells plp1 cells;
 inverse-arp;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 oam-period (seconds | disable);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
 rate burst length);
 queue-length number;
 }
 }
}

```

```
 }
 vci vpi-identifier.vci-identifier;
 }
 preferred;
 primary;
 (vrrp-group | vrrp-inet6-group) group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-type authentication;
 authentication-key key;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority-number number;
 track {
 priority-cost seconds;
 priority-hold-time interface-name {
 interface priority;
 bandwidth-threshold bits-per-second {
 priority;
 }
 }
 }
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
}
virtual-address [addresses];
}
}
}
```

**Related Documentation**

- [Junos OS Hierarchy and RFC Reference](#)
- [Ethernet Interfaces Feature Guide for Routing Devices](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

---

## [\[edit protocols connections\] Hierarchy Level](#)

The following statements can also be configured at the [\[edit logical-systems logical-system-name protocols connections\]](#) hierarchy level.

```
interface-switch connection-name {
 interface interface-name.unit-number;
 interface interface-name.unit-number;
}
```

- Related Documentation**
- [Junos OS Hierarchy and RFC Reference](#)
  - [Ethernet Interfaces Feature Guide for Routing Devices](#)
  - [Junos OS Network Interfaces Library for Routing Devices](#)

## [edit protocols dot1x] Hierarchy Level

```
dot1x {
 authenticator
 authentication-profile-name access-profile-name;
 interface interface-ids {
 maximum-requests integer;
 retries integer;
 quiet-period seconds;
 transmit-period seconds;
 reauthentication (disable | interval seconds);
 server-timeout seconds;
 supplicant (single);
 supplicant-timeout seconds;
 }
}
```

- Related Documentation**
- [Junos OS Hierarchy and RFC Reference](#)
  - [Ethernet Interfaces Feature Guide for Routing Devices](#)
  - [Junos OS Network Interfaces Library for Routing Devices](#)

## [edit protocols iccp] Hierarchy Level

The following statement hierarchy can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
iccp {
 traceoptions;
 local-ip-address ip address;
 session-establishment-hold-time value;
 authentication-key string;
 peer ip-address {
 local-ip-address ip address;
 session-establishment-hold-time value;
 authentication-key string;
 redundancy-group-id-list redundancy-group-id-list;
 liveness-detection;
 }
}
```

- Related Documentation**
- [iccp on page 581](#)
  - [Configuring ICCP for MC-LAG on page 191](#)

## [edit protocols lacp] Hierarchy Level

---

```
ppm (Ethernet Switching)
 traceoptions {
 file filename <files number> <size size> <world-readable | no-world-readable>;
 flag flag <disable>;
 }
fast-hello-issu
```

- Related Documentation**
- *Junos OS Hierarchy and RFC Reference*
  - *Ethernet Interfaces Feature Guide for Routing Devices*
  - *Configuring Distributed Periodic Packet Management*
  - *Junos OS Network Interfaces Library for Routing Devices*

## [edit protocols oam] Hierarchy Level

---

```
ethernet {
 connectivity-fault-management {
 action-profile profile-name {
 default-actions {
 interface-down;
 }
 }
 event {
 adjacency-loss;
 interface-status-tlv (down | lower-layer-down);
 port-status-tlv blocked;
 rdi;
 }
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {
 bridge-domain name;
 routing-instance r1 {
 bridge-domain name;
 instance vpls-instance;
 interface (ge | xe) fpc/pic/port.domain;
 level number;
 maintenance-association name {
 mep identifier {
 direction (up | down)
 interface (ge | xe) fpc/pic/port.domain (working | protect);
 auto-discovery;
 lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
 rem-err-xcon | xcon);
 priority number;
 }
 }
 }
 }
 mip-half-function (none | default | explicit);
```

```

name-format (character-string | none | dns | mac+2oct);
short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
protect-maintenance-association protect-ma-name;
remote-maintenance-association remote-ma-name;
continuity-check {
 hold-interval minutes;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number;
}
maintenance-association ma-name {
 mip-half-function (none | default | explicit);
 mep mep-id {
 auto-discovery;
 direction (up | down);
 interface interface-name (working | protect);
 priority number;
 remote-mep mep-id {
 action-profile profile-name;
 sla-iterator-profile profile-name {
 data-tlv-size bytes;
 iteration-count frames;
 priority priority-value;
 }
 }
 }
}
}
}
performance-monitoring {
 hardware-assisted-timestamping;
 sla-iterator-profiles {
 profile-name {
 disable;
 calculation-weight {
 delay delay-weight;
 delay-variation delay-variation-weight;
 }
 cycle-time milliseconds;
 iteration-period connections;
 measurement-type (loss | statistical-frame-loss | two-way-delay);
 }
 }
}
no-aggregate-delegate-processing;
}
link-fault-management {
 action-profile profile-name {
 action {
 syslog;
 link-down;
 send-critical-event;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 }
 }
 }
}

```

```
 frame-period-summary count;
 symbol-period count;
 }
 protocol-down;
}
}
interface interface-name {
 apply-action-profile profile-name;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 link-discovery (active | passive);
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
}
}
fnp {
 interval <100ms | 1s | 10s | 1m | 10m>;
 loss-threshold number
 interface interface name {
 domain-id domain-id
 }
}
}
```

**Related Documentation**

- [Junos OS Hierarchy and RFC Reference](#)
- [Ethernet Interfaces Feature Guide for Routing Devices](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

---

## [edit protocols ppp] Hierarchy Level

```
monitor-session (interface-name | all);
traceoptions {
 file filename <files number> <match regular-expression> <size size> <world-readable |
 no-world-readable>;
 flag flag <disable>;
}
```

**Related Documentation**

- [Junos OS Hierarchy and RFC Reference](#)
- [Ethernet Interfaces Feature Guide for Routing Devices](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

## [edit protocols pppoe] Hierarchy Level

```

pppoe {
 no-send-pads-error;
 no-send-pads-ac-info
 pado-advertise;
 service-name-tables table-name {
 service service-name {
 drop;
 delay seconds;
 terminate;
 dynamic-profile profile-name;
 routing-instance routing-instance-name;
 max-sessions number;
 agent-specifier {
 aci circuit-id-string ari remote-id-string {
 drop;
 delay seconds;
 terminate;
 dynamic-profile profile-name;
 routing-instance routing-instance-name;
 static-interface interface-name;
 }
 }
 }
 }
 traceoptions {
 file <filename> <files number> <match regular-expression> <size maximum-file-size>
 <world-readable | no-world-readable>;
 filter {
 aci regular-expression;
 ari regular-expresion;
 service-name regular-expresion;
 underlying-interface interface-name;
 }
 flag flag;
 level (all | error | info | notice | verbose | warning);
 no-remote-trace;
 }
}

```

## [edit protocols protection-group] Hierarchy Level

```

ethernet-ringring-name {
 east-interface {
 control-channel channel-name {
 vlan number;
 }
 }
 guard-interval number;
 node-id mac-address;
 restore-interval number;
 ring-protection-link-owner;
 west-interface {

```

```
control-channel channel-name {
 vlan number;
}
}
}
```

**Related  
Documentation**

- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces Feature Guide for Routing Devices*
- *Junos OS Network Interfaces Library for Routing Devices*

---

## [edit protocols vrrp] Hierarchy Level

The following statement hierarchy can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
protocols {
 vrrp {
 asymmetric-hold-time;
 delegate-processing;
 failover-delay milliseconds;
 global-advertisements-threshold advertisement-value;
 skew-timer-disable;
 startup-silent-period seconds;
 traceoptions {
 file <filename> <files number> <match regular-expression> <microsecond-stamp>
 <size maximum-file-size> <world-readable | no-world-readable>;
 flag flag;
 no-remote-trace;
 }
 version-3;
 }
}
```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*
- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces Feature Guide for Routing Devices*
- *Junos OS Network Interfaces Library for Routing Devices*

---

## [edit system processes] Hierarchy Level

```
dialer-services {
 disable;
}
isdn-signaling {
 disable;
 reject-incoming;
}
```





- Related Documentation**
- *ISDN Configuration Overview*
  - *Disabling ISDN Processes*

## 802.3ad

|                                 |                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>802.3ad {     ae interface-number (primary   backup);     lacp {         port-priority;     } }</pre>                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>fastether-options</b> ],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ]                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>primary</b> and <b>backup</b> options added in Junos OS Release 8.3.                                                                                                                                                                                                  |
| <b>Description</b>              | Specify aggregated Ethernet logical interface number.                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>ae interface-number</b>—Aggregated Ethernet logical interface number.</p> <p><b>Range:</b> 0 through 15</p> <p><b>primary</b>—For link protection configurations, specify the primary link for egress traffic.</p> <p><b>backup</b>—For link protection configurations, specify the backup link for egress traffic.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Aggregated Ethernet Interface</i></li> <li>• <i>Configuring Aggregated Ethernet Link Protection</i></li> </ul>                                                                                                                                                     |



## accept

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>accept (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure stacked-vlan-ranges <b>dynamic-profile</b> <i>profile-name</i> ],<br>[edit interfaces <i>interface-name</i> auto-configure vlan-ranges <b>dynamic-profile</b> <i>profile-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br><b>dhcp-v4</b> option added in Junos OS Release 10.0.<br><b>dhcp-v6</b> , <b>inet6</b> and <b>pppoe</b> options added in Junos OS Release 10.2.<br><b>any</b> option added in Junos OS Release 10.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Specify the type of VLAN Ethernet packet accepted by an interface that is associated with a VLAN dynamic profile or stacked VLAN dynamic profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>any</b>—Any packet type. Specifies that any incoming packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes. This option is used when configuring wholesaling in a Layer 2 network.</p> <p><b>dhcp-v4</b>—IPv4 DHCP packet type. Specifies that incoming IPv4 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes</p> <hr/> <div> <b>NOTE:</b> The DHCP-specific <b>mac-address</b> and <b>option-82</b> options are rejected if the <b>accept</b> statement is not set to <b>dhcp-v4</b>.</div> <hr/> <p><b>dhcp-v6</b>—IPv6 DHCP packet type. Specifies that incoming IPv6 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes.</p> <p><b>inet</b>—IPv4 Ethernet and ARP packet type.</p> <p><b>inet6</b>—IPv6 Ethernet packet type.</p> <p><b>pppoe</b>—Point-to-Point Protocol over Ethernet packet type.</p> <hr/> <div> <b>NOTE:</b> The <b>pppoe</b> VLAN Ethernet packet type option is supported only for MPC/MIC interfaces.</div> <hr/> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

- Related Documentation**
- *Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs*
  - *Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs*
  - *Configuring VLAN Interfaces for the Layer 2 Wholesale Solution*
  - *Configuring Subscriber Packet Types to Trigger VLAN Authentication*

## accept-source-mac

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> accept-source-mac {     mac-address mac-address {         policer {             input cos-policer-name;             output cos-policer-name;         }     } } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],<br/> [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.<br/> Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.<br/> Statement introduced in Junos OS Release 13.2 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For Gigabit Ethernet intelligent queuing (IQ) interfaces only, accept traffic from and to the specified remote media access control (MAC) address.</p> <p>The <b>accept-source-mac</b> statement is equivalent to the <b>source-address-filter</b> statement, which is valid for aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only. To allow the interface to receive packets from specific MAC addresses, include the <b>accept-source-mac</b> statement.</p> <p>On untagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement simultaneously. On tagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement with an identical MAC address specified in both filters.</p> <p>The statements are explained separately.</p> |
|                                 | <p> <b>NOTE:</b> The <b>policer</b> statement is not supported on PTX Series Packet Transport Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                 | <p> <b>NOTE:</b> On QFX platforms, if you configure source MAC addresses for an interface using the <i>static-mac</i> or <i>persistent-learning</i> statements and later configure a different MAC address for the same interface using the <b>accept-source-mac</b> statement, the MAC addresses that you previously configured for the interface remain in the ethernet-switching table and can still be used to send packets to the interface.</p>                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.<br/> interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

- Related Documentation**
- [Configuring MAC Address Filtering](#)
  - [Configuring MAC Address Filtering on PTX Series Packet Transport Routers](#)
  - [source-filtering on page 724](#)

## access-concentrator

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>access-concentrator <i>name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>     | <p>[edit dynamic-profiles <i>profile-name</i> interfaces demux0 unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">family pppoe</a>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">family pppoe</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>]</p> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Support at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>] and [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>] hierarchy levels introduced in Junos OS Release 10.1.</p> <p>Support at the [edit ... <a href="#">family pppoe</a>] hierarchies introduced in Junos OS Release 11.2.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>         | Configure an alternative access concentrator name in the AC-NAME tag in a PPPoE control packet for use with a dynamic PPPoE subscriber interface. If you do not configure the access concentrator name, the AC-NAME tag contains the system name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



**NOTE:** The [edit ... [family pppoe](#)] hierarchies are supported only on MX Series routers with MPCs.

|                                 |                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <i>name</i> —Name of the access concentrator.                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Identifying the Access Concentrator</a></li> <li>• <a href="#">Configuring the PPPoE Family for an Underlying Interface</a></li> <li>• <a href="#">Configuring Dynamic PPPoE Subscriber Interfaces</a></li> <li>• <a href="#">PPPoE Overview</a></li> </ul> |

## access-profile

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>access-profile name;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | <code>[edit interfaces interface-name ppp-options chap],</code><br><code>[edit interfaces interface-name ppp-options pap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options pap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options pap]</code>                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for PAP added in Junos OS Release 8.3.<br>Support for VLAN and stacked VLAN ranges added in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For CHAP authentication, the mapping between peer names (or “clients” ) and the secrets associated with their respective links. For PAP authentication, the peer’s username and password.</p> <p>For Asynchronous Transfer Mode 2 (ATM2) IQ interfaces only, you can configure a Challenge Handshake Authentication Protocol (CHAP) access profile on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 logical link control (LLC) encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul> |
| <b>Options</b>                  | <b>name</b> —Name of the access profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 123</a></li><li>• <a href="#">Configuring the PPP Password Authentication Protocol On a Physical Interface on page 126</a></li><li>• <a href="#">default-chap-secret on page 479</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                |

## accounting

|                                 |                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>accounting {   destination-class-usage;   source-class-usage {     direction;   } }</pre>                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                  |
| <b>Description</b>              | Enable IP packet counters on an interface.<br><br>The statements are explained separately.                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 235</a></li> </ul>                                                                                                                  |

## accounting-profile

|                                 |                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>accounting-profile <i>name</i>;</code>                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ]                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                               |
| <b>Description</b>              | Enable collection of accounting data for the specified physical or logical interface or interface range.                                                                                                                                |
| <b>Options</b>                  | <b><i>name</i></b> —Name of the accounting profile.                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying an Accounting Profile to the Physical Interface on page 151</a></li> <li>• <a href="#">Applying an Accounting Profile to the Logical Interface on page 178</a></li> </ul> |

## acfc

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | acfc;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> <a href="#">ppp-options compression</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> <a href="#">ppp-options compression</a> ]                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | <p>For interfaces with PPP encapsulation, configure compression of the Data Link Layer address and control fields. The <b>acfc</b> option is not supported with <b>frame-relay-ppp</b> encapsulation.</p> <p>On M320, M120, and T Series routers, address and control field compression (ACFC) is not supported for any ISO family protocols. Do not include the <b>acfc</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a>] hierarchy level when you include the <b>family iso</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a>] hierarchy level.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PPP Address and Control Field Compression on page 129</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## acknowledge-retries

---

|                                 |                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>acknowledge-retries <i>number</i>;</code>                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                           |
| <b>Description</b>              | For link services and voice services interfaces only, configure the number of retransmission attempts to be made for consecutive hello or remove link messages following the expiration of the acknowledgment timer.                        |
| <b>Options</b>                  | <p><b><i>number</i></b>—Number of retransmission attempts to be made following the expiration of the acknowledgment timer.</p> <p><b>Range:</b> 1 through 5</p> <p><b>Default:</b> 2</p>                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">action-red-differential-delay on page 396</a></li> <li>• <a href="#">hello-timer on page 571</a></li> </ul> |

## acknowledge-timer

---

|                                 |                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>acknowledge-timer <i>milliseconds</i>;</code>                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                          |
| <b>Description</b>              | For link services and voice services interfaces only, configure the maximum time, in milliseconds, to wait for an add link acknowledgment, hello acknowledgment, or remove link acknowledgment message.                                                    |
| <b>Options</b>                  | <p><code>milliseconds</code>—Time, in milliseconds, to wait for an add link acknowledgment, hello acknowledgment, or remove link acknowledgment message.</p> <p><b>Range:</b> 1 through 10 milliseconds</p> <p><b>Default:</b> 4 milliseconds</p>          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">address on page 397</a>, <a href="#">hello-timer on page 571</a></li><li>• <a href="#">hello-timer on page 571</a></li></ul> |

## action (OAM)

---

|                                 |                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>action {<br/>  <a href="#">link-down</a>;<br/>  <a href="#">send-critical-event</a>;<br/>  <a href="#">syslog</a>;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> ]                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                       |
| <b>Description</b>              | Define the action or actions to be taken when the OAM fault event occurs.                                                           |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul>        |

## action (Policer)

---

|                                 |                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | action {<br>loss-priority high then discard;<br>}                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit firewall three-color-policer <i>policer-name</i> ]                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                  |
| <b>Description</b>              | This statement discards high loss priority traffic as part of a configuration using tricolor marking on a logical interface.                                                   |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Class of Service Feature Guide for Routing Devices</i></li> <li>• <a href="#">logical-interface-policer on page 655</a></li> </ul> |

## action-profile (Applying to CFM)

---

|                                 |                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | action-profile <i>profile-name</i> ;                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i> <a href="#">remote-mep</a> <i>mep-id</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                        |
| <b>Description</b>              | Identify the action profile to use.                                                                                                                                                                  |
| <b>Options</b>                  | <i>profile-name</i> —Name of the action profile to use.                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li> </ul>                                                                        |

## action-profile (Defining for CFM)

---

**Syntax** `action-profile profile-name {  
 event {  
 ais-trigger-condition {  
 adjacency-loss;  
 all-defects;  
 cross-connect-ccm;  
 erroneous-ccm;  
 receive-ais;  
 }  
 interface-status-tlv (down | lower-layer-down);  
 port-status-tlv blocked;  
 rdi;  
 }  
 action {  
 interface-down;  
 log-and-generate-ais {  
 interval(1m | 1s);  
 level value;  
 priority value;  
 }  
 }  
 default-actions {  
 interface-down;  
 }  
}`

**Hierarchy Level** [edit protocols oam ethernet [connectivity-fault-management](#)]

**Release Information** Statement introduced in Junos OS Release 8.4.

**Description** Configure a name and default action for an action profile.

**Options** *profile-name*—Name of the action profile.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring a CFM Action Profile to Specify CFM Actions for CFM Events](#)
- [default-actions on page 478](#)
- [event \(CFM\)](#)
- [interface-down on page 607](#)

## action-profile (Defining for LFM)

|                                 |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> action-profile <i>profile-name</i> {   action {     link-down;     send-critical-event;     syslog;   }   event {     link-adjacency-loss;     link-event-rate {       frame-error <i>count</i>;       frame-period <i>count</i>;       frame-period-summary <i>count</i>;       symbol-period <i>count</i>;     }     protocol-down;   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management</a> ]                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Configure a name, one or more actions, and the events that trigger the action for an action profile.                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><i>profile-name</i>—Name of the action profile.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring an OAM Action Profile</a></li> </ul>                                                                                                                                                                                                                                                      |

## action-red-differential-delay

---

|                                 |                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>action-red-differential-delay (disable-tx   remove-link);</code>                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                              |
| <b>Description</b>              | For link services and voice services interfaces only, configure the action to be taken when the differential delay exceeds the red limit.                                                                                      |
| <b>Options</b>                  | <b>disable-tx</b> —Disable transmission on the bundle link.<br><b>remove-link</b> —Remove bundle link from service.<br><b>Default:</b> <b>disable-tx</b>                                                                       |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">remote on page 810</a></li><li>• <a href="#">yellow-differential-delay on page 954</a></li></ul> |

## address

```

Syntax address address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 destination address;
 destination-profile name;
 eui-64;
 master-only;
 multipoint-destination address dlcidlcid-identifier;
 multipoint-destination address {
 epd-threshold cells;
 inverse-arp;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 oam-period (disable | seconds);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
 length);
 queue-length number;
 }
 vci vpi-identifier.vci-identifier;
 }
 primary;
 preferred;
 (vrrp-group | vrrp-inet6-group) group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-type authentication;
 authentication-key key;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority-number number;
 track {
 priority-cost seconds;
 priority-hold-time interface-name {
 interface priority;
 bandwidth-threshold bits-per-second {
 priority;
 }
 }
 }
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 virtual-address [addresses];
 }
}

```

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number* family *family*],  
 [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*  
 family *family*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the interface address.



**NOTE:** The vrrp High Availability functionality is not available on the QFX Series.



**Options** *address*—Address of the interface.

- In Junos OS Release 13.3 and later, when you configure an IPv6 host address and an IPv6 subnet address on an interface, the commit operation fails.
- In releases earlier than Junos OS Release 13.3, when you use the same configuration on an interface, the commit operation succeeds, but only one of the IPv6 addresses that was entered is assigned to the interface. The other address is not applied.



**NOTE:** If you configure the same address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration. The remaining address configurations are ignored and can leave interfaces without an address. Interfaces that do not have an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

For example, in the following configuration the address configuration of interface xe-0/0/1.0 is ignored:

```
interfaces {
 xe-0/0/0 {
 unit 0 {
 family inet {
 address 192.168.1.1/24;
 }
 }
 }
 xe-0/0/1 {
 unit 0 {
 family inet {
 address 192.168.1.1/24;
 }
 }
 }
}
```

For more information on configuring the same address on multiple interfaces, see [“Configuring the Interface Address” on page 187](#).

The remaining statements are explained separately.



**NOTE:** The `edit logical-systems` hierarchy is not available on QFabric systems.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

- Related Documentation**
- [Configuring the Protocol Family on page 186](#)
  - *Junos OS Administration Library for Routing Devices*
  - *family*
  - [negotiate-address on page 704](#)
  - [unnumbered-address \(Ethernet\) on page 920](#)
  - *Junos OS Administration Library for Routing Devices*

---

## advertise-interval

- Syntax**     `advertise-interval milliseconds;`
- Hierarchy Level**     [edit interfaces *interface-name* sonet-options [aps](#)]
- Release Information**     Statement introduced before Junos OS Release 7.4.
- Description**     Modify the Automatic Protection Switching (APS) interval at which the protect and working routers send packets to their neighbors to advertise that they are operational. A router considers its neighbor to be operational for a period, called the hold time, that is, by default, three times the advertisement interval.
- Options**     *milliseconds*—Interval between advertisement packets.  
                 **Range:** 1 through 65,534 milliseconds  
                 **Default:** 1000 milliseconds
- Required Privilege Level**     interface—To view this statement in the configuration.  
                 interface-control—To add this statement to the configuration.
- Related Documentation**     • *Configuring APS Timers*

---

## age

---

|                                 |                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | age (30m   10m   1m   30s   10s);                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> linktrace]                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                           |
| <b>Description</b>              | Time to wait (in minutes or seconds) for a response. If no response is received, the request and response entry is deleted from the linktrace database. |
| <b>Default</b>                  | 10 minutes                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Linktrace Protocol in CFM</i></li></ul>                                                          |

## agent-specifier

---

**Syntax**

```
agent-specifier {
 aci circuit-id-string ari remote-id-string {
 drop;
 delay seconds;
 terminate;
 dynamic-profile profile-name;
 routing-instance routing-instance-name;
 static-interface interface-name;
 }
}
```

**Hierarchy Level** [edit protocols pppoe service-name-tables *table-name* **service** *service-name*]

**Release Information** Statement introduced in Junos OS Release 10.0.  
**drop**, **delay**, **terminate**, **dynamic-profile**, **routing-instance**, and **static-interface** options introduced in Junos OS Release 10.2.

**Description** Specify the action taken by the interface for the specified agent circuit identifier/agent remote identifier (ACI/ARI) pair when the interface receives a PPPoE Active Discovery Initiation (PADI) control packet that includes the vendor-specific tag with ACI/ARI pair information. You can configure an ACI/ARI pair for a named service, **empty** service, or **any** service in a PPPoE service name table. A maximum of 8000 ACI/ARI pairs are supported per PPPoE service name table. You can distribute the ACI/ARI pairs in any combination among the named, **empty**, and **any** service entries in the service name table.

You can use an asterisk (\*) as a wildcard character to match ACI/ARI pairs, the ACI alone, or the ARI alone. The asterisk can be placed only at the beginning, the end, or both the beginning and end of the identifier string. You can also specify an asterisk alone for either the ACI or the ARI. You cannot specify only an asterisk for both the ACI and the ARI. When you specify a single asterisk as the identifier, that identifier is ignored in the PADI packet.

For example, suppose you care about matching only the ACI and do not care what value the ARI has in the PADI packet, or even whether the packet contains an ARI value. In this case you can set the **remote-id-string** to a single asterisk. Then the interface ignores the ARI received in the packet and the interface takes action based only on matching the specified ACI.

**Default** The default action is terminate.

**Options** **aci *circuit-id-string***—Identifier for the agent circuit ID that corresponds to the DSLAM interface that initiated the service request. This is a string of up to 63 characters.

**ari *remote-id-string***—Identifier for the subscriber associated with the DSLAM interface that initiated the service request. This is a string of up to 63 characters.

The remaining statements are explained separately.

|                                 |                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PPPoE Service Name Tables</i></li> <li>• <i>Assigning an ACI/ARI Pair to a Service Name and Configuring the Action Taken When the Client Request Includes ACI/ARI Information</i></li> </ul> |

## aggregate (Gigabit Ethernet CoS Policer)

|                                 |                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>aggregate {   bandwidth-limit <i>bps</i>;   burst-size-limit <i>bytes</i>; }</pre>                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile policer cos-policer-name</a> ]                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                        |
| <b>Description</b>              | <p>Define a policer to apply to nonpremium traffic.</p> <p>The statements are explained separately.</p>                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Gigabit Ethernet Policers</i></li> <li>• <a href="#">premium (Hierarchical Policer) on page 786</a></li> <li>• <a href="#">ieee802.1p on page 583</a></li> </ul> |

## aggregate (Hierarchical Policer)

---

|                                 |                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>aggregate {<br/>    if-exceeding {<br/>        bandwidth-limit <i>bandwidth</i>;<br/>        burst-size-limit <i>burst</i>;<br/>    }<br/>    then {<br/>        discard;<br/>    }<br/>}</pre>                                                       |
| <b>Hierarchy Level</b>          | [edit firewall <a href="#">hierarchical-policer</a> ]                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                              |
| <b>Description</b>              | On M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure an aggregate hierarchical policer. |
| <b>Options</b>                  | Options are described separately.                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Applying Policers on page 203</a></li><li>• <i>Class of Service Feature Guide for Routing Devices</i></li></ul>                                                                                        |

## aggregate (SONET/SDH)

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>aggregate asx;</pre>                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Specify aggregated SONET/SDH logical interface number.                                                                  |
| <b>Options</b>                  | <b>asx</b> —Aggregated SONET/SDH logical interface number.<br><b>Range:</b> 0 through 15                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated SONET/SDH Interfaces</i></li></ul>                    |

---

## aggregate-ports

---

|                                 |                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | aggregate-ports;                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit chassis fpc <i>slot-number</i> pic <i>pic-number</i> ]                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.                                                                                                                      |
| <b>Description</b>              | For T Series routers only, specify OC768-over-OC192 mode on the 4-port OC192C PIC. Four OC192 links are aggregated into one OC768 link with one logical interface. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode</i></li></ul>                                          |

## aggregated-ether-options

```
Syntax aggregated-ether-options {
 ethernet-switch-profile {
 ethernet-policer-profile {
 input-priority-map {
 ieee802.1p premium [values];
 }
 output-priority-map {
 classifier {
 premium {
 forwarding-class class-name {
 loss-priority (high | low);
 }
 }
 }
 }
 }
 policer cos-policer-name {
 aggregate {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 premium {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 }
 }
 (mac-learn-enable | no-mac-learn-enable);
 }
 (flow-control | no-flow-control);
 lacp {
 (active | passive);
 link-protection {
 disable;
 (revertive | non-revertive);
 periodic interval;
 system-priority priority;
 system-id system-id;
 }
 link-protection;
 load-balance;
 link-speed speed;
 logical-interface-chassis-redundancy;
 logical-interface-fpc-redundancy;
 (loopback | no-loopback);
 minimum-links number;
 rebalance-periodic time hour:minute <interval hours>;
 source-address-filter {
 mac-address;
 (source-filtering | no-source-filtering);
 }
 }
}
```



|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit interfaces aex]                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Configure aggregated Ethernet-specific interface properties.<br><br>The statements are explained separately.            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Interfaces Overview</i></li> </ul>                                 |

## aggregated-sonet-options

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>aggregated-sonet-options {   link-speed <i>speed</i>;   minimum-links <i>number</i>; }</pre>                       |
| <b>Hierarchy Level</b>          | [edit interfaces asx]                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Configure aggregated SONET/SDH-specific interface properties.<br><br>The statements are explained separately.           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Aggregated SONET/SDH Interfaces</i></li> </ul>                  |

## alarm (optics-options)

---

|                                 |                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>alarm low-light-alarm {<br/>    (link-down   syslog);<br/>}</pre>                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>optics-options</b> ]                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.                                                                                                      |
| <b>Description</b>              | Specify the action to take if the receiving optics signal is below the optics low-light alarm threshold.                                                                                                                     |
| <b>Options</b>                  | <b>link-down</b> —Drop the 10-Gigabit Ethernet link and marks link as down.<br><br><b>syslog</b> —Write the optics information to the system log.                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i></li><li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li></ul> |

## alias (Interfaces)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>alias <i>alias-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 13.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Configure a textual description of a physical interface or the logical unit of an interface to be the alias of an interface name. The alias name can be a single line of text. If the text contains spaces, enclose it in quotation marks. If you configure an alias name, the alias name is displayed instead of the interface name in the output of all <b>show</b> , <b>show interfaces</b> , and other operational mode commands. In Junos OS Release 12.3R8 and later, display of the alias can be suppressed in favor of the actual interface name by using the <b>display no-interface-alias</b> parameter along with the show command. |
| <b>Options</b>                  | <b><i>alias-name</i></b> —Text to denote an easily identifiable, meaningful alias name for the interface. If the text includes spaces, enclose the entire text in quotation marks.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Adding an Interface Alias Name on page 111</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## allow-any-vci

|                                 |                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>allow-any-vci;</code>                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit 0],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit 0]    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers. |
| <b>Description</b>              | Dedicate entire ATM device to ATM cell relay circuit.                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an ATM1 Cell-Relay Circuit Overview</i></li> </ul>                                      |

## allow-fragmentation

---

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | allow-fragmentation;                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 15.1X53-D10 for QFX10000 switches.                                                                                   |
| <b>Description</b>              | Enable fragmentation of generic routing encapsulation (GRE) encapsulated packets regardless of maximum transmission unit (MTU) value.                                                                          |
| <b>Default</b>                  | By default, the GRE-encapsulated packets are dropped if the packet size exceeds the MTU setting of the egress interface.                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>reassemble-packets</i></li><li>• <i>Configuring Unicast Tunnels</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>             |

## allow-remote-loopback

---

|                                 |                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | allow-remote-loopback;                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols <i>oam link-fault-management interface interface-name negotiation-options</i> ]                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                     |
| <b>Description</b>              | Enable the remote loopback on IQ2 and IQ2-E Gigabit Ethernet interfaces, and Ethernet interfaces on the MX Series routers and EX Series switches. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling Remote Loopback Support on the Local Interface</i></li></ul>                                  |

## annex

|                                 |                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>annex (annex-a   annex-b);</code>                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> shdsl-options],<br>[edit interfaces <i>interface-name</i> sonet-options aps],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> shdsl-options]                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.                                                                                                                                                                                                                                |
| <b>Description</b>              | For M320 and M120 routers only, for Multiplex Section Protection (MSP) switching on SDH interfaces, set <b>annex-b</b> . You must also configure the <b>working protection circuit</b> under the [edit interfaces <i>so-fpc/pic/port</i> sonet-options aps] hierarchy level. |
| <b>Default</b>                  | <b>annex-b</b>                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <b>annex-a</b> —Use for North American SHDSL network implementations.<br><br><b>annex-b</b> —Use for European SHDSL network implementations.                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                      |

## apply-action-profile

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>apply-action-profile <i>profile-name</i>;</code>                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet link-fault-management interface</b> ]                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                           |
| <b>Description</b>              | Apply the specified action profile to the interface for link-fault management.                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying an Action Profile</i></li> </ul>                                   |

## aps

---

**Syntax**    `aps {`  
              `advertise-interval milliseconds;`  
              `annex-b`  
              `authentication-key key;`  
              `(break-before-make | no-break-before-make);`  
              `fast-aps-switch;`  
              `force;`  
              `hold-time milliseconds;`  
              `lockout;`  
              `neighbor address;`  
              `paired-group group-name;`  
              `preserve-interface;`  
              `protect-circuit group-name;`  
              `request;`  
              `revert-time seconds;`  
              `switching-mode (bidirectional | unidirectional);`  
              `working-circuit group-name;`  
              `}`

**Hierarchy Level**    `[edit interfaces interface-name sonet-options]`

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure Automatic Protection Switching (APS) on the router.

For DS3 channels on a channelized OC12 interface, configure APS on channel 0 only. If you configure APS on channels 1 through 11, it is ignored.

The statements are explained separately.

**Required Privilege**    interface—To view this statement in the configuration.  
**Level**    interface-control—To add this statement to the configuration.

**Related Documentation**

- *Automatic Protection Switching and Multiplex Section Protection Overview*

## arp (Interfaces)

|                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                         | <code>arp <i>ip-address</i> (mac   multicast-mac) <i>mac-address</i> publish;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>                                                                                                                                                                | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                                                                                                                                                            | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                                                                                                                                                    | For Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, configure Address Resolution Protocol (ARP) table entries, mapping IP addresses to MAC addresses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                                                                                                                                                                        | <p><b><i>ip-address</i></b>—IP address to map to the MAC address. The IP address specified must be part of the subnet defined in the enclosing <b>address</b> statement.</p> <p><b>mac <i>mac-address</i></b>—MAC address to map to the IP address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>multicast-mac <i>mac-address</i></b>—Multicast MAC address to map to the IP address. Specify the multicast MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>publish</b>—(Optional) Have the router or switch reply to ARP requests for the specified IP address. If you omit this option, the router or switch uses the entry to reach the destination but does not reply to ARP requests.</p> |
| <div>  <b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems. </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b>                                                                                                                                                       | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>                                                                                                                                                          | <ul style="list-style-type: none"> <li>Configuring Static ARP Table Entries For Mapping IP Addresses to MAC Addresses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## asynchronous-notification

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (asynchronous-notification   no-asynchronous-notification);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> gigether-options ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For all 10-Gigabit Ethernet interfaces, M120, M320, and T Series routers, configure support for notification of link down alarm generation and transfer.</p> <p>(MX Series routers, T Series routers) For all Gigabit Ethernet interfaces (1-Gigabit, 10-Gigabit, and 100-Gigabit), configure support for notification of link down alarm generation and transfer.</p> <p>(M120 and M320 routers) For all 10-Gigabit Ethernet PIC interfaces, configure support for notification of link down alarm generation and transfer.</p> <ul style="list-style-type: none"><li>• <b>asynchronous-notification</b>—Support notification of link down alarm generation and transfer.</li><li>• <b>no-asynchronous-notification</b>—Prohibit notification of link down alarm generation and transfer.</li></ul> |
| <b>Default</b>                  | Support for notification of link down alarm generation and transfer is not enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Gigabit Ethernet Notification of Link Down Alarm Overview</i></li><li>• <i>Configuring Gigabit Ethernet Notification of Link Down Alarm</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



---

## atm-encapsulation

---

|                                 |                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | atm-encapsulation (direct   plcp);                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> e3-options],<br>[edit interfaces at- <i>fpc/pic/port</i> t3-options]                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                    |
| <b>Description</b>              | Configure encapsulation for E3 and T3 traffic over ATM interfaces.                                                                                                                   |
| <b>Default</b>                  | Physical Layer Convergence Protocol (PLCP) encapsulation is the default for T3 traffic and for E3 traffic using G.751 framing.                                                       |
| <b>Options</b>                  | <b>direct</b> —Use direct encapsulation. G.832 framing on E3 interfaces requires direct encapsulation.<br><br><b>plcp</b> —Use PLCP encapsulation.                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <a href="#">encapsulation (Physical Interface) on page 526</a></li></ul> |

## atm-options

```

Syntax atm-options {
 cell-bundle-size cells;
 ilmi;
 linear-red-profiles profile-name {
 high-plp-max-threshold percent;
 low-plp-max-threshold percent;
 queue-depth cells high-plp-threshold percent low-plp-threshold percent;
 }
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
 pic-type (atm1 | atm2);
 plp-to-clp;
 promiscuous-mode {
 vpi vpi-identifier;
 }
 scheduler-maps map-name {
 forwarding-class class-name {
 epd-threshold cells plp1 cells;
 linear-red-profile profile-name;
 priority (high | low);
 transmit-weight (cells number | percent number);
 }
 vc-cos-mode (alternate | strict);
 }
 use-null-cw;
 vpi vpi-identifier {
 maximum-vcs maximum-vcs;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 oam-period (disable | seconds);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
 length);
 queue-length number;
 }
 }
 }

```

**Hierarchy Level** [edit interfaces *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description** Configure ATM-specific physical interface properties.  
  
The statements are explained separately.



NOTE: Certain options apply only to specific platforms.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Interface Encapsulations Overview on page 41](#)
- [multipoint-destination on page 694](#)
- [shaping on page 844](#)
- [vci on page 927](#)

## atm-scheduler-map

**Syntax** atm-scheduler-map (*map-name* | default);

**Hierarchy Level** [edit interfaces *interface-name* [unit](#) *logical-unit-number*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* [unit](#) *logical-unit-number*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Associate a scheduler map with a virtual circuit on a logical interface.

**Options** *map-name*—Name of scheduler map that you define at the [edit interfaces *interface-name* [atm-options scheduler-maps](#)] hierarchy level.

**default**—The default scheduler mapping.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [ATM2 IQ VC Tunnel CoS Components Overview](#)
- [scheduler-maps \(For ATM2 IQ Interfaces\) on page 831](#)

## authentication

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>authentication {<br/>  packet-types [<i>packet-types</i>];<br/>  password <i>password-string</i>;<br/>  username-include {<br/>    circuit-type;<br/>    delimiter <i>delimiter-character</i>;<br/>    domain-name <i>domain-name-string</i>;<br/>    interface-name;<br/>    mac-address;<br/>    option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;<br/>    radius-realm <i>radius-realm-string</i>;<br/>    user-prefix <i>user-prefix-string</i>;<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges</a> ]                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Specify the authentication parameters that trigger the Access-Request message to AAA for the interface.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | system—To view this statement in the configuration.<br>system-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Subscribers over Static Interfaces</i></li><li>• <i>Configuring the Static Subscriber Global Authentication Password</i></li></ul>                                                                                                                                                                                                                                                                                   |

## authentication-key

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>authentication-key key;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Configure the Automatic Protection Switching (APS) authentication key (password).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <b>key</b> —Authentication password. It can be 1 through 8 characters long. Configure the same key for both the working and protect routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Basic Automatic Protect Switching</i></li> <li>• For information about the <b>authentication-key</b> statement at the [edit interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> (vrrp-group   vrrp-inet6-group) <i>group-number</i>] or [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>unit-number</i> family (inet   inet6) address <i>address</i> (vrrp-group   vrrp-inet6-group) <i>group-number</i>] hierarchy level, see the <i>Junos OS High Availability Library for Routing Devices</i>.</li> </ul> |

## authentication-profile-name

|                                 |                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>authentication-profile-name access-profile-name;</code>                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit protocols dot1x <a href="#">authenticator</a> ]                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                       |
| <b>Description</b>              | Specify the RADIUS authentication profile to use for user authentication when establishing an IEEE 802.1x Port-Based Network Access Control ( <b>dot1x</b> ) connection.                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface control—To add this statement to the configuration.                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">authenticator on page 420</a></li> <li>• <a href="#">dot1x on page 498</a></li> </ul> |

## authenticator

---

**Syntax**     authenticator {  
                 authentication-profile-name *access-profile-name*;  
                 **interface** *interface-id* {  
                     maximum-requests *integer*;  
                     quiet-period *seconds*;  
                     reauthentication (disable | interval *seconds*);  
                     retries *integer*;  
                     server-timeout *seconds*;  
                     supplicant (*single*);  
                     supplicant-timeout *seconds*;  
                     transmit-period *seconds*;  
                   }  
                 }

**Hierarchy Level**     [edit protocols dot1x]

**Release Information**     Statement introduced in Junos OS Release 9.3.

**Description**     Specify an authentication profile for user or client authentication and configure the Ethernet interface for 802.1x protocol operation.

**Options**     **authentication-profile-name** *access-profile-name*—Specifies the RADIUS authentication profile for user or client authentication.

The remaining statements are explained separately.

**Required Privilege Level**     protocols—To view this statement in the configuration.  
                                 protocols-control—To add this statement to the configuration.

**Related Documentation**     • *IEEE 802.1x Port-Based Network Access Control Overview*  
                                 • [authentication-profile-name on page 419](#)  
                                 • [dot1x on page 498](#)

## auto-configure

```
Syntax auto-configure {
 vlan-ranges {
 access-profile profile-name;
 authentication {
 packet-types [packet-types];
 password password-string;
 username-include {
 circuit-type;
 delimiter delimiter-character;
 domain-name domain-name-string;
 interface-name;
 mac-address;
 option-18;
 option-37;
 option-82 <circuit-id> <remote-id>;
 radius-realm radius-realm-string;
 user-prefix user-prefix-string;
 }
 }
 dynamic-profile profile-name {
 accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
 ranges (any | low-tag)–(any | high-tag);
 }
 override;
 }
 stacked-vlan-ranges {
 access-profile profile-name;
 authentication {
 packet-types [packet-types];
 password password-string;
 username-include {
 circuit-type;
 delimiter delimiter-character;
 domain-name domain-name-string;
 interface-name;
 mac-address;
 option-18;
 option-37;
 option-82 <circuit-id> <remote-id>;
 radius-realm radius-realm-string;
 user-prefix user-prefix-string;
 }
 }
 dynamic-profile profile-name {
 accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
 ranges (any | low-tag–high-tag), (any | low-tag–high-tag);
 }
 override;
 }
 remove-when-no-subscribers;
}
```

|                                 |                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> ]                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                              |
| <b>Description</b>              | Enable the configuration of dynamic, auto-sensed VLANs.<br><br>The remaining statements are explained separately.                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs</i></li><li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs</i></li></ul> |

---

## auto-discovery

---

|                                 |                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | auto-discovery;                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management</a> maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                               |
| <b>Description</b>              | Enable the MEP to accept continuity check messages from all remote MEPs.                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li></ul>                                                                 |



## auto-negotiation

|                            |                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (auto-negotiation   no-auto-negotiation) <remote-fault (local-interface-online   local-interface-offline)>;                                                                                                                      |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ],<br>[edit interfaces <i>ge-pim</i> /0/0 <b>switch-options</b> <b>switch-port</b> <i>port-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.6.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                  |
| <b>Description</b>         | For Gigabit Ethernet interfaces on M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers explicitly enable autonegotiation and remote fault. For EX Series switches, explicitly enable autonegotiation only.  |

- **auto-negotiation**—Enables autonegotiation. This is the default.
- **no-auto-negotiation**—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure the link mode and speed.

When you configure Tri-Rate Ethernet copper interfaces to operate at 1 Gbps, autonegotiation must be enabled.



**NOTE:** On EX Series switches, an interface configuration that disables autonegotiation and manually sets the link speed to 1 Gbps is accepted when you commit the configuration; however, if the interface you are configuring is a Tri-Rate Ethernet copper interface, the configuration is ignored as invalid and autonegotiation is enabled by default.

To correct the invalid configuration and disable autonegotiation:

1. Delete the **no-auto-negotiation** statement and commit the configuration.
2. Set the link speed to 10 or 100 Mbps, set **no-auto-negotiation**, and commit the configuration.

On EX Series switches, if the link speed and duplex mode are also configured, the interfaces use the values configured as the desired values in the negotiation. If autonegotiation is disabled, the link speed and link mode must be configured.



**NOTE:** On T4000 routers, the **auto-negotiation** command is ignored for interfaces other than Gigabit Ethernet.

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | Autonegotiation is automatically enabled. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.                                                                                                                         |
| <b>Options</b>                  | <b>remote-fault (local-interface-online   local-interface-offline)</b> —(Optional) For M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers only, manually configure remote fault on an interface.<br><b>Default:</b> local-interface-online |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Gigabit Ethernet Autonegotiation Overview</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul>             |

---

## backup-destination

|                                 |                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | backup-destination <i>address</i> ;                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i> <i>tunnel</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i> <i>tunnel</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                          |
| <b>Description</b>              | For tunnel interfaces, specify the remote address of the backup tunnel.                                                                                                                                                                    |
| <b>Options</b>                  | <b>address</b> —Address of the remote side of the connection.                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">destination (Tunnels) on page 488</a></li></ul>                                                              |

## backup-interface

|                                 |                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>backup-interface es-fpc/pic/port;</code>                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <code>[edit interfaces es-fpc/pic/port es-options]</code>                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                    |
| <b>Description</b>              | Configure a backup ES Physical Interface Card (PIC). If the primary ES PIC fails, the backup becomes active, inherits all the tunnels and security associations (SAs), and acts as the new next hop for IP Security (IPsec) traffic. |
| <b>Options</b>                  | <code>es-fpc/pic/port</code> —Name of ES interface to serve as the backup.                                                                                                                                                           |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                  |

## backup-options

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>backup-options {   interface interface-name; }</pre>                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <code>[edit interfaces interface-name unit logical-unit-number]</code> ,<br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]</code>                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | <p>Configure an interface to be used as a backup interface if the primary interface goes down. This is used to support ISDN dial backup operation.</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an ISDN Dialer Interface as a Backup Interface</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>                    |

## bandwidth (Interfaces)

---

|                            |                                                                                                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>bandwidth rate;</code>                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                      |
| <b>Description</b>         | Configure an informational-only bandwidth value for an interface. This statement is valid for all logical interface types except multilink and aggregated interfaces.                                          |




**NOTE:** We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the **bandwidth** statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:

$$\text{cost} = \text{reference-bandwidth} / \text{bandwidth},$$

where bandwidth is the physical interface speed. However, if you specify a value for bandwidth using the **bandwidth** statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <b>rate</b> —Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b> ; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.<br><b>Range:</b> Not limited. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Bandwidth on page 169</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## bandwidth-limit (Hierarchical Policer)

|                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                 | <code>bandwidth-limit <i>bps</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                        | [edit <a href="#">dynamic-profiles</a> <i>profile-name</i> firewall hierarchical-policer aggregate if-exceeding],<br>[edit <a href="#">dynamic-profiles</a> <i>profile-name</i> firewall hierarchical-policer <a href="#">premium</a> if-exceeding],<br>[edit firewall hierarchical-policer aggregate if-exceeding],<br>[edit firewall hierarchical-policer <a href="#">premium</a> if-exceeding]                                                                                                                                 |
| <b>Release Information</b>                                                                                                                                                                                                                                                    | Statement introduced in Junos OS Release 9.5.<br>Support at the [edit <a href="#">dynamic-profiles ... if-exceeding</a> ] hierarchy level introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>                                                                                                                                                                                                                                                            | On M40e, M120, and M320 (with FFPC and SFPC) edge routers; on MPCs hosted on MX Series routers; on T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs; and on T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure the maximum average bandwidth for premium or aggregate traffic in a hierarchical policer.                                                                                                                                                                     |
| <b>Options</b>                                                                                                                                                                                                                                                                | <p><b><i>bps</i></b>—You can specify the number of bits per second either as a decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p><b>Range:</b></p> <ul style="list-style-type: none"> <li>• 32,000 through 50,000,000,000 on M Series routers</li> <li>• 32,000 through 100,000,000,000 on T Series routers</li> <li>• 32,000 through 18,446,744,073,709,551,615 on MX Series routers</li> </ul>                                      |
| <div>  <p><b>NOTE:</b> When you specify a numeric value beyond the supported bandwidth of the PFE, the router caps the bandwidth at the maximum supported bandwidth of the PFE.</p> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                               | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• <a href="#">Hierarchical Policer Configuration Overview</a></li> <li>• <a href="#">Policer Bandwidth and Burst-Size Limits</a></li> <li>• <a href="#">Policer Color-Marking and Actions</a></li> <li>• <a href="#">Single Token Bucket Algorithm</a></li> <li>• <a href="#">Determining Proper Burst Size for Traffic Policers</a></li> <li>• <a href="#">aggregate (Hierarchical Policer)</a></li> <li>• <a href="#">burst-size-limit (Hierarchical Policer) on page 439</a></li> </ul> |

- [premium \(Hierarchical Policer\) on page 786](#)

## **bandwidth-limit (Policer for Gigabit Ethernet Interfaces)**

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bandwidth-limit <i>bps</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">aggregate</a> ],<br>[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">premium</a> ]                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Define a policer to apply to nonpremium traffic.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <b><i>bps</i></b> —Bandwidth limit, in bits per second. Specify either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).<br><b>Range:</b> 32 Kbps through 32 gigabits per second (Gbps). For IQ2 and IQ2-E interfaces 65,536 bps through 1 Gbps. For 10-Gigabit IQ2 and IQ2-E interfaces 65,536 bps through 10 Gbps. |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit Ethernet Policers</a></li><li>• <a href="#">burst-size-limit (Policer for Gigabit Ethernet Interfaces) on page 440</a></li></ul>                                                                                                                                                                                                                |

## bert-algorithm

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>bert-algorithm <i>algorithm</i>;</code>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>                                                                                                                                                                                                                                                            |
| <b>Description</b>         | Configure the pattern to send in the bit stream during a bit error rate test (BERT). Applies to T1, E3, T3, and multichannel DS3 interfaces, the channelized interfaces (DS3, OC12, STM1), and channelized IQ and IQE interfaces (E1, E3 and DS3).                                                                                                                                                                    |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `bert-algorithm` statement must be included at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b> | <p><b><i>algorithm</i></b>—Pattern to send in the bit stream. There are two categories of test patterns: pseudorandom and repetitive. Both patterns conform to CCITT/ITU O.151, O.152, O.153, and O.161 standards. The algorithm can be one of the following patterns:</p> <ul style="list-style-type: none"> <li>• <b>all-ones-repeating</b>—Pattern is all ones.</li> <li>• <b>all-zeros-repeating</b>—Pattern is all zeros.</li> <li>• <b>alternating-double-ones-zeros</b>—Pattern is alternating pairs of ones and zeros.</li> <li>• <b>alternating-ones-zeros</b>—Pattern is alternating ones and zeros.</li> <li>• <b>pseudo-2e3</b>—Pattern is <math>2^3 - 1</math>.</li> <li>• <b>pseudo-2e4</b>—Pattern is <math>2^4 - 1</math>.</li> <li>• <b>pseudo-2e5</b>—Pattern is <math>2^5 - 1</math>.</li> <li>• <b>pseudo-2e6</b>—Pattern is <math>2^6 - 1</math>.</li> <li>• <b>pseudo-2e7</b>—Pattern is <math>2^7 - 1</math>.</li> <li>• <b>pseudo-2e9-o153</b>—Pattern is <math>2^9 - 1</math>, as defined in the O153 standard.</li> <li>• <b>pseudo-2e10</b>—Pattern is <math>2^{10} - 1</math>.</li> <li>• <b>pseudo-2e11-o152</b>—Pattern is <math>2^{11} - 1</math>, as defined in the O152 standard.</li> </ul> |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- **pseudo-2e15-o151**—Pattern is  $2^{15} - 1$ , as defined in the O151 standard.
- **pseudo-2e17**—Pattern is  $2^{17} - 1$ .
- **pseudo-2e18**—Pattern is  $2^{18} - 1$ .
- **pseudo-2e20-o151**—Pattern is  $2^{20} - 1$ , as defined in the O151 standard.
- **pseudo-2e20-o153**—Pattern is  $2^{20} - 1$ , as defined in the O153 standard.
- **pseudo-2e21**—Pattern is  $2^{21} - 1$ .
- **pseudo-2e22**—Pattern is  $2^{22} - 1$ .
- **pseudo-2e23-o151**—Pattern is  $2^{23} - 1$ , as defined in the O151 standard.
- **pseudo-2e25**—Pattern is  $2^{25} - 1$ .
- **pseudo-2e28**—Pattern is  $2^{28} - 1$ .
- **pseudo-2e29**—Pattern is  $2^{29} - 1$ .
- **pseudo-2e31**—Pattern is  $2^{31} - 1$ .
- **pseudo-2e32**—Pattern is  $2^{32} - 1$ .
- **repeating-1-in-4**—One bit in four is set to 1; the others are set to 0.
- **repeating-1-in-8**—One bit in eight is set to 1; the others are set to 0.
- **repeating-3-in-24**—Three bits in twenty four are set to 1; the others are set to 0.

**Default:** pseudo-2e3

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

- |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">Interface Diagnostics on page 317</a></li><li>• <i>Configuring E1 BERT Properties</i></li><li>• <i>Configuring E3 BERT Properties</i></li><li>• <i>Configuring T1 BERT Properties</i></li><li>• <i>Configuring T3 BERT Properties</i></li><li>• <i>Examples: Configuring T3 Interfaces</i></li><li>• <a href="#">bert-error-rate on page 431</a></li><li>• <a href="#">bert-period on page 433</a></li></ul> |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## bert-error-rate

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>bert-error-rate rate;</code>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>                                                                                                                                                                                                                                                            |
| <b>Description</b>         | Configure the bit error rate to use in a BERT procedure. Applies to E1, E3, T1, or T3 interfaces, and to the channelized interfaces (DS3, OC3, OC12, and STM1).                                                                                                                                                                                                                                                       |




**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `bert-error-rate` statement must be included at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <p><b>rate</b>—Bit error rate.</p> <p><b>Range:</b> 0 through 7, which corresponds to <math>10^{-1}</math> (1 error per bit) to <math>10^{-7}</math> (1 error per 10 million bits)</p> <p><b>Default:</b> 0</p>                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">bert-algorithm on page 429</a></li> <li>• <a href="#">bert-period on page 433</a></li> <li>• <a href="#">ds0-options on page 501</a></li> <li>• <a href="#">e1-options on page 517</a></li> <li>• <a href="#">e3-options on page 518</a></li> <li>• <a href="#">t1-options on page 872</a></li> <li>• <a href="#">t3-options on page 875</a></li> <li>• <a href="#">Interface Diagnostics on page 317</a></li> <li>• <a href="#">Configuring E1 BERT Properties</a></li> <li>• <a href="#">Configuring E3 BERT Properties</a></li> </ul> |

- *Configuring T1 BERT Properties*
- *Configuring T3 BERT Properties*
- *Examples: Configuring T3 Interfaces*

## bert-period

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bert-period <i>seconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>ce1-fpc/pic/port</i>],<br/>         [edit interfaces <i>ct1-fpc/pic/port</i>],<br/>         [edit interfaces <i>interface-name ds0-options</i>],<br/>         [edit interfaces <i>interface-name e1-options</i>],<br/>         [edit interfaces <i>interface-name e3-options</i>],<br/>         [edit interfaces <i>interface-name t1-options</i>],<br/>         [edit interfaces <i>interface-name t3-options</i>]</p>                                                                                                                                                |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>Configure the duration of a BERT test. Applies to E1, E3, T1, and T3 interfaces, and to E1, E3, T1, and T3 partitions on the channelized interfaces (CE1, CT1, DS3, OC3, OC12, OC48, STM1, STM4, and STM16).</p> <p>E1 and T1 IQ, IQE, and standard interfaces support an extended BERT period range, up to 86,400 seconds (24 hours).</p>                                                                                                                                                                                                                                                 |
|                                 | <p> <b>NOTE:</b> When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <code>bert-period</code> statement must be included at the [edit interfaces <i>ce1-fpc/pic/port</i>] or [edit interfaces <i>ct1-fpc/pic/port</i>] hierarchy level as appropriate.</p>                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b><i>seconds</i></b>—Test duration. Range and default values vary by interface type.</p> <p><b>Range:</b></p> <ul style="list-style-type: none"> <li>PIC-dependent—Normal BERT period: either 1 through 239 seconds or 1 through 240 seconds</li> <li>PIC-dependent—Extended BERT period: from 1 through 86,400 seconds</li> </ul> <p><b>Default:</b></p> <ul style="list-style-type: none"> <li>Normal BERT period: 10 seconds</li> <li>Extended BERT period (on supported E1 interfaces): 10 seconds</li> <li>Extended BERT period (on supported T1 interfaces): 240 seconds</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Interface Diagnostics on page 317</a></li> <li><a href="#">Configuring E1 BERT Properties</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

- [Configuring E3 BERT Properties](#)
- [Configuring T1 BERT Properties](#)
- [Configuring T3 BERT Properties](#)
- [bert-algorithm on page 429](#)
- [bert-error-rate on page 431](#)

---

## bridge-domain

---

|                                 |                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bridge-domain <i>name</i>;</code><br><code>  vlan-id [ <i>vlan-identifiers</i> ];</code><br><code>}</code>                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>maintenance-domain-name</i> ],<br>[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>maintenance-domain-name</i> virtual-switch <i>virtual-switch-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                                                                                                                                                                               |
| <b>Description</b>              | (MX Series routers only) Specify the OAM Ethernet CFM maintenance domain bridge domain.                                                                                                                                                                                     |
| <b>Options</b>                  | <i>name</i> —Specify the name of the bridge domain.<br><br><i>vlan-identifiers</i> —Specify one or more VLAN identifiers.                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Maintenance Intermediate Points (MIPs)</a></li><li>• <a href="#">maintenance-domain on page 671</a></li></ul>                                                                                               |

## broadcast

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>broadcast address;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> <b>address</b> <i>address</i> ]                                                                                                                                                                   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                    |
| <b>Description</b>         | Set the broadcast address on the network or subnet. On a subnet you cannot specify a host address of 0 (0.0.0.0), nor can you specify a broadcast address (255.255.255.255). For example, in the statement <b>set interface ge-0/0/0 unit 0 family inet address 10.1.1.0/24</b> , the subnet address 10.1.1.0 has the host address of 0. Hence, you cannot configure this address. Similarly, for the subnet, you cannot use the broadcast address 10.1.1.255/24. |
| <b>Default</b>             | The default broadcast address has a host portion of all ones.                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>             | <b>address</b> —Broadcast address. The address must have a host portion of either all ones or all zeros. You cannot specify the addresses 0.0.0.0 or 255.255.255.255.                                                                                                                                                                                                                                                                                             |



**NOTE:** The edit logical-systems hierarchy is not available on QFabric systems.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Address on page 187</a></li> </ul>       |

## buildout (E3 or T3 over ATM Interfaces)

---

|                                 |                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>buildout <i>feet</i>;</code>                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> e3-options],<br>[edit interfaces at- <i>fpc/pic/port</i> t3-options]                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                      |
| <b>Description</b>              | For E3 and T3 traffic over ATM interfaces, set the buildout value.                                                                     |
| <b>Options</b>                  | <b><i>feet</i></b> —The buildout value in feet.<br><b>Range:</b> 0 through 450 feet (137 meters)<br><b>Default:</b> 10 feet (3 meters) |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li></ul>                            |

## buildout (T1 Interfaces)

|                            |                                                                                                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>buildout value;</code>                                                                                                                    |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ]<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]                                        |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. |
| <b>Description</b>         | For T1 interfaces, set the buildout value.                                                                                                      |



**NOTE:** When configuring CT1 interfaces on 10-port Channelized E1/T1 IQE PICs and 16-Port Channelized E1/T1 Circuit Emulation MICs, the **buildout** statement must be included at the hierarchy level.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | The default buildout value is 0 through 132 feet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p>You can set the buildout value to one of the following:</p> <ul style="list-style-type: none"> <li>• <b>0-132</b>—0 through 132 feet (0 through 40 meters)</li> <li>• <b>133-265</b>—133 through 265 feet (40 through 81 meters)</li> <li>• <b>266-398</b>—266 through 398 feet (81 through 121 meters)</li> <li>• <b>399-531</b>—399 through 531 feet (121 through 162 meters)</li> <li>• <b>532-655</b>—532 through 655 feet (162 through 200 meters)</li> <li>• <b>long-7.5db</b>—For MX Series only, long buildout with 7.5 dB transmit attenuation</li> <li>• <b>long-15db</b>—For MX Series only, long buildout with 15 dB transmit attenuation</li> <li>• <b>long-22.5db</b>—For MX Series only, long buildout with 22.5 dB transmit attenuation</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the T1 Buildout</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## bundle

---

|                            |                                                                                                                                                                                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>bundle (ml-<i>fpc/pic/port</i>   ls-<i>fpc/pic/port</i>);</code>                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                               |
| <b>Description</b>         | Associate the multilink interface with the logical interface it is joining. You can include this statement for the <b>mlfr-end-to-end</b> and <b>mlfr-uni-nni</b> protocol families only.                                                                       |

**NOTE:**

For M Series routers and T Series routers, the following caveats apply:

- Maximum supported throughput on the bundle interfaces is 45 Mbps.
  - Bundling of the logical interfaces under a T3 physical interface into the same or different bundles is not supported.
- 

|                                 |                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <b>ml-<i>fpc/pic/port</i></b> —Name of the multilink interface you are linking.<br><b>ls-<i>fpc/pic/port</i></b> —Name of the link services interface you are linking. |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                      |



## burst-size-limit (Hierarchical Policer)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>burst-size-limit bytes;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit <a href="#">dynamic-profiles profile-name</a> firewall hierarchical-policer aggregate if-exceeding],<br>[edit <a href="#">dynamic-profiles profile-name</a> firewall hierarchical-policer <a href="#">premium</a> if-exceeding],<br>[edit firewall hierarchical-policer aggregate if-exceeding],<br>[edit firewall hierarchical-policer <a href="#">premium</a> if-exceeding]                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support at the [edit <a href="#">dynamic-profiles ... if exceeding</a> ] hierarchy level introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | On M40e, M120, and M320 (with FFPC and SFPC) edge routers; on MPCs hosted on MX Series routers; on T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs; and on T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure the burst-size limit for premium or aggregate traffic in a hierarchical policer.                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>bytes</b>—Burst-size limit in bytes. The minimum recommended value is the maximum transmission unit (MTU) of the IP packets being policed. You can specify the value either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p><b>Range:</b> 1500 through 2,147,450,880 (1500 through 100,000,000,000 on MPCs hosted on MX Series routers)</p>                                                                                                                            |
| <b>Required Privilege Level</b> | <p>firewall—To view this statement in the configuration.</p> <p>firewall-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Hierarchical Policer Configuration Overview</i></li> <li>• <i>Policer Bandwidth and Burst-Size Limits</i></li> <li>• <i>Policer Color-Marking and Actions</i></li> <li>• <i>Single Token Bucket Algorithm</i></li> <li>• <i>Determining Proper Burst Size for Traffic Policers</i></li> <li>• <i>Hierarchical Policers</i></li> <li>• <i>aggregate (Hierarchical Policer)</i></li> <li>• <a href="#">bandwidth-limit (Hierarchical Policer) on page 427</a></li> <li>• <a href="#">premium (Hierarchical Policer) on page 786</a></li> </ul> |

## burst-size-limit (Policer for Gigabit Ethernet Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>burst-size-limit <i>bytes</i>;</code>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">aggregate</a>],</code><br><code>[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">premium</a>]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Define a policer to apply to nonpremium traffic.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <b><i>bytes</i></b> —Burst length.<br><b>Range:</b> 1500 through 100,000,000 bytes                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit Ethernet Policers</a></li><li>• <a href="#">bandwidth-limit (Policer for Gigabit Ethernet Interfaces)</a> on page 428</li></ul>                                                                                                                                                                                             |

## byte-encoding

|                            |                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | byte-encoding (nx56   nx64);                                                                                                                              |
| <b>Hierarchy Level</b>     | [edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> t1-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.           |
| <b>Description</b>         | Set the byte encoding on a DS0 or T1 interface to use 7 bits per byte or 8 bits per byte.                                                                 |



**NOTE:** When configuring T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the byte-encoding statement must be included at the [edit interfaces t1-*fpc/pic/port*] hierarchy level.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | The default byte encoding is 8 bits per byte (nx64).                                                                    |
| <b>Options</b>                  | nx56—Use 7 bits per byte.<br><br>nx64—Use 8 bits per byte.                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring T1 Byte Encoding</i></li> </ul>                                 |

## bytes

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>bytes {<br/>    c2 <i>value</i>;<br/>    e1-quiet <i>value</i>;<br/>    f1 <i>value</i>;<br/>    f2 <i>value</i>;<br/>    s1 <i>value</i>;<br/>    z3 <i>value</i>;<br/>    z4 <i>value</i>;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>sonet-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Release Information      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description              | Set values in some SONET/SDH header bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Options                  | <p><b>c2 <i>value</i></b>—Path signal label SONET/SDH overhead byte. SONET/SDH frames use the C2 byte to indicate the contents of the payload inside the frame. SONET/SDH interfaces use the C2 byte to indicate whether the payload is scrambled.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0xCF</p> <p><b>e1-quiet <i>value</i></b>—Default idle byte sent on the orderwire SONET/SDH overhead bytes. The router does not support the orderwire channel, and hence sends this byte continuously.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0x7F</p> <p><b>f1 <i>value</i>, f2 <i>value</i>, z3 <i>value</i>, z4 <i>value</i></b>—SONET/SDH overhead bytes.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0x00</p> <p><b>s1 <i>value</i></b>—Synchronization message SONET overhead byte. This byte is normally controlled as a side effect of the system reference clock configuration and the state of the external clock coming from an interface if the system reference clocks have been configured to use an external reference.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0xCC</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Header Byte Values to Identify Error Conditions</i></li><li>• <i>no-concatenate</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## calculation-weight

---

|                            |                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | calculation-weight {<br>delay <i>delay-value</i> ;<br>delay-variation <i>delay-variation-value</i> ;<br>}                                     |
| <b>Hierarchy Level</b>     | [edit protocols <a href="#">oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles</a> <i>profile-name</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                       |
| <b>Description</b>         | Configure the calculation weight for delay and delay variation.                                                                               |



**NOTE:** This option is applicable only for two-way delay measurement.

The remaining statements are explained separately.

|                                 |                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> <li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li> <li>• <i>delay</i></li> <li>• <i>delay-variation</i></li> </ul> |

## cbit-parity

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (cbit-parity   no-cbit-parity);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For T3 interfaces only, enable or disable C-bit parity mode, which controls the type of framing that is present on the transmitted T3 signal. When C-bit parity mode is enabled, the C-bit positions are used for the far-end block error (FEBE), far-end alarm and control (FEAC), terminal data link, path parity, and mode indicator bits, as defined in ANSI T1.107a-1989. For ATM and ATM2 IQ2 and IQ2-E interfaces, M23 framing is used when the <b>no-cbit-parity</b> statement is included. For all other interfaces, M13 framing is used when the <b>no-cbit-parity</b> statement is included. |
| <b>Default</b>                  | C-bit parity mode is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <i>Disabling T3 C-Bit Parity Mode</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## cbr

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>cbr rate;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <p>[edit interfaces at-<i>fpc/pic/port</i> atm-options vpi <i>vpi-identifier</i> shaping],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> shaping],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> shaping]</p>                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | For ATM encapsulation only, define a constant bit rate bandwidth utilization in the traffic-shaping profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>                  | Unspecified bit rate (UBR); that is, bandwidth utilization is unlimited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>rate</b>—Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p> <p>For ATM1 and ATM2 OC3 interfaces, the maximum available rate is 100 percent of <i>line-rate</i>, or 135,600,000 bps. For ATM1 OC12 interfaces, the maximum available rate is 50 percent of <i>line-rate</i>, or 271,263,396 bps. For ATM2 IQ interfaces, the maximum available rate is 542,526,792 bps.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Defining the ATM Traffic-Shaping Profile Overview</a></li> <li>• <a href="#">rtvbr on page 825</a></li> <li>• <a href="#">shaping on page 844</a></li> <li>• <a href="#">vbr on page 925</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |


## cell-bundle-size

---

|                                 |                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>cell-bundle-size <i>cells</i>;</code>                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options],<br>[edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                     |
| <b>Description</b>              | For ATM2 IQ interfaces using ATM Layer 2 circuit cell-relay transport mode only, configure the maximum number of ATM cells per frame.                                                                                                                                 |
| <b>Options</b>                  | <b><i>cells</i></b> —Maximum number of cells.<br><b>Default:</b> 1 cell<br><b>Range:</b> 1 through 176 cells                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum Overview</i></li></ul>                                                                                                                                             |




## chap

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> chap {   access-profile <i>name</i>;   challenge-length minimum <i>minimum-length</i> maximum <i>maximum-length</i>;   default-chap-secret <i>name</i>;   local-name <i>name</i>;   passive; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <pre> [edit interfaces <i>interface-name</i> <b>ppp-options</b>], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>ppp-options</b>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>   <b>ppp-options</b>] </pre>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>Allow each side of a link to challenge its peer, using a “secret” known only to the authenticator and that peer. The secret is not sent over the link.</p> <p>By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes no CHAP challenges and denies all incoming CHAP challenges.</p> <p>For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul> |
|                                 | <p> <b>BEST PRACTICE:</b> On inline service (si) interfaces for L2TP, only the chap statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.</p>                                                                                                                                                                                                                                                                                                                                                                              |
|                                 | The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 123</a></li> <li>• <a href="#">Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile</a></li> <li>• <a href="#">Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface</a></li> </ul>                                                                                                                                                                                                                                                                                                                                          |

## chap-secret

---

|                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                | <code>chap-secret <i>chap-secret</i>;</code>                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>                                                                                                                                                       | [edit access profile <i>profile-name</i> client <i>client-name</i> ]                                                                                                                                                                                                                                       |
| <b>Release Information</b>                                                                                                                                                   | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                          |
| <b>Description</b>                                                                                                                                                           | For interfaces with PPP encapsulation on which the PPP Challenge Handshake Authentication Protocol (CHAP) is configured, configure the shared secret (the CHAP secret key associated with a peer), as defined in RFC 1994.                                                                                 |
| <div> <b>NOTE:</b> This statement is not supported for L2TP LNS on MX Series routers.</div> |                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                                                                                                                                                               | <i>chap-secret</i> —The secret key associated with a peer.                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b>                                                                                                                                              | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.                                                                                                                                                                                            |
| <b>Related Documentation</b>                                                                                                                                                 | <ul style="list-style-type: none"><li>• <i>Configuring the CHAP Secret for an L2TP Profile</i></li><li>• <a href="#">Configuring PPP CHAP Authentication on page 176</a></li><li>• <a href="#">pap-password on page 748</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul> |

## circuit-type

---

|                                 |                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>circuit-type;</code>                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                       |
| <b>Description</b>              | Specify that the circuit type is concatenated with the username during the subscriber authentication process.                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>                                                                                                                      |

## cisco-interoperability

|                                 |                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>cisco-interoperability send-lip-remove-link-for-link-reject;</code>                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.                                                                                         |
| <b>Description</b>              | FRF.16 interoperability settings.                                                                                                     |
| <b>Options</b>                  | <b>send-lip-remove-link-for-link-reject</b> —Send Link Integrity Protocol remove link when an add-link rejection message is received. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## classifier

|                                 |                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> classifier {   per-unit-scheduler {     forwarding-class <i>class-name</i> {       loss-priority (high   low);     }   } } </pre>                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">output-priority-map</a> ]                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                             |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the classifier for the output priority map to be applied to outgoing frames on this interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Output Priority Map</i></li> <li>• <a href="#">input-priority-map on page 599</a></li> </ul>                                                                        |

## clear-dont-fragment-bit

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear-dont-fragment-bit;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>Clear the don't-fragment (DF) bit on all IP version 4 (IPv4) packets entering a generic routing encapsulation (GRE) tunnel. If the encapsulated packet's size exceeds the tunnel's maximum transmission unit (MTU), the packet is fragmented before encapsulation. The statement is supported only on MX Series routers and all M Series routers except the M320 router.</p> <p>When you configure the <b>clear-dont-fragment-bit</b> statement on an interface with the MPLS protocol family enabled, you must specify an MTU value. This MTU value must not be greater than maximum supported value, which is 9192.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

---

## clock-rate

---

|                                 |                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clock-rate rate;</code>                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                         |
| <b>Description</b>              | For EIA-530 and V.35 interfaces, configure the interface speed, in megahertz (MHz).                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>rate</b>—You can specify one of the following rates:</p> <ul style="list-style-type: none"><li>• 2.048 MHz</li><li>• 2.341 MHz</li><li>• 2.731 MHz</li><li>• 3.277 MHz</li><li>• 4.096 MHz</li><li>• 5.461 MHz</li><li>• 8.192 MHz</li><li>• 16.384 MHz</li></ul> <p><b>Default:</b> 16.384 MHz</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Clocking Mode on page 300</a></li></ul>                                                                                                                                                                                        |

## clocking

---

|                            |                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>clocking (external [interface <i>interface-name</i> ]   internal);</code>                                                                                                                           |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>]</code>                                                                                                                                                      |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br><b>interface</b> option added in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. |
| <b>Description</b>         | For interfaces that can use various clock sources, configure the source of the transmit clock on each interface.                                                                                          |



**NOTE:** On Channelized SONET/SDH PICs, if you set the parent (or the master) controller clock to **external**, then you must set the child controller clocks to the default value—that is, **internal**.

For example, on the Channelized STM1 PIC, if the clock on the Channelized STM1 interface (which is the master controller) is set to **external**, then you must not configure the CE1 interface (which is the child controller) clock to **external**. Instead you must configure the CE1 interface clock to **internal**.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <b>external</b> —The clock source is provided by the data communication equipment (DCE).<br><br><b>interface <i>interface-name</i></b> —Configure clocking for the drop-and insert feature. When configuring this feature, both ports must use the same clock source: either the router's internal clock or an external clock on one of the interfaces. If an external clock source is required, one interface must specify clocking external and the other must specify the same clock.<br><br><b>internal</b> —Use the internal stratum 3 clock as the reference clock.<br><b>Default:</b> <b>internal</b> |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Clock Source on page 116</a></li><li>• <a href="#">Configuring the Clock Source on SONET/SDH Interfaces</a></li><li>• <a href="#">Clock Sources on Channelized Interfaces</a></li><li>• <a href="#">Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots</a></li><li>• <a href="#">loop-timing on page 657</a></li></ul>                                                                                                                                                                                              |

---

## clocking-mode

---

|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clocking-mode (dce   internal   loop);                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                             |
| <b>Description</b>              | For EIA-530 and V.35 interfaces, configure the clock mode. You cannot configure <b>clocking-mode dce</b> on a DTE router using an X.21 serial line protocol (detected automatically when an X.21 cable is plugged into the serial interface). |
| <b>Options</b>                  | <b>dce</b> —DCE timing (DTE mode only, not valid for X.21).<br><br><b>internal</b> —Internal baud timing.<br><br><b>loop</b> —Loop timing.<br><b>Default:</b> loop                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Clocking Mode on page 300</a></li></ul>                                                                                                                            |

## community

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>community <i>name</i> {<br/>    invert-match;<br/>    members [ <i>community-ids</i> ];<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>     | [edit dynamic policy-options],<br>[edit logical-systems <i>logical-system-name</i> policy-options],<br>[edit policy-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for configuration in the dynamic database introduced in Junos OS Release 9.5.<br>Support for configuration in the dynamic database introduced in Junos OS Release 9.5 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>         | Define a community or extended community for use in a routing policy match condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>             | <p><b><i>name</i></b>—Name that identifies the regular expression. The name can contain letters, numbers, and hyphens (-) and can be up to 255 characters. To include spaces in the name, enclose it in quotation marks (" ").</p> <p><b><i>invert-match</i></b>—Invert the results of the community expression matching. The <b>community</b> match condition defines a regular expression and if it matches the community attribute of the received prefix, Junos OS returns a TRUE result. If not, Junos OS returns a FALSE result. The <b><i>invert-match</i></b> statement makes Junos OS behave to the contrary. If there is a match, Junos OS returns a FALSE result. If there is no match, Junos OS returns a TRUE result.</p> <p><b><i>members community-ids</i></b>—One or more community members. If you specify more than one member, you must enclose all members in brackets.</p> <p>The format for <b><i>community-ids</i></b> is:</p> <p><b><i>as-number:community-value</i></b></p> <p>Starting in Junos OS Release 15.1, you can apply a wildcard member <b><i>segmented-nh.*:0</i></b> to apply the BGP policy to all the S-PMSI A-D routes carrying extended community information.</p> <p><b><i>as-number</i></b> is the AS number and can be a value in the range from 0 through 65,535.<br/><b><i>community-value</i></b> is the community identifier and can be a number in the range from 0 through 65,535.</p> <p>You also can specify <b><i>community-ids</i></b> for communities as one of the following well-known community names, which are defined in RFC 1997, <i>BGP Communities Attribute</i>:</p> <ul style="list-style-type: none"><li>• <b><i>no-export</i></b>—Routes containing this community name are not advertised outside a BGP confederation boundary.</li></ul> |



- **no-advertise**—Routes containing this community name are not advertised to other BGP peers.
- **no-export-subconfed**—Routes containing this community name are not advertised to external BGP peers, including peers in other members' ASs inside a BGP confederation.

You can explicitly exclude BGP community information with a static route using the **none** option. Include **none** when configuring an individual route in the **route** portion of the **static** statement to override a **community** option specified in the **defaults** portion of the statement.

The format for extended **community-ids** is the following:

*type:administrator:assigned-number*

**type** is the type of extended community and can be either a **bandwidth**, **target**, **origin**, **domain-id**, **src-as**, or **rt-import** community or a 16-bit number that identifies a specific BGP extended community. The **target** community identifies the destination to which the route is going. The **origin** community identifies where the route originated. The **domain-id** community identifies the OSPF domain from which the route originated. The **src-as** community identifies the autonomous system from which the route originated. The **rt-import** community identifies the route to install in the routing table.



**NOTE:** For **src-as**, you can specify only an AS number and not an IP address. For **rt-import**, you can specify only an IP address and not an AS number.

**administrator** is the administrator. It is either an AS number or an IPv4 address prefix, depending on the type of extended community.

**assigned-number** identifies the local provider.

The format for linking a bandwidth with an AS number is:

*bandwidth:as-number:bandwidth*

**as-number** specifies the AS number and **bandwidth** specifies the bandwidth in bytes per second.



**NOTE:** In Junos OS Release 9.1 and later, you can specify 4-byte AS numbers as defined in RFC 4893, *BGP Support for Four-octet AS Number Space*, as well as the 2-byte AS numbers that are supported in earlier releases of the Junos OS. In plain-number format, you can configure a value in the range from 1 through 4,294,967,295. To configure a target or origin extended community that includes a 4-byte AS number in the plain-number format, append the letter “L” to the end of number. For example, a target community with the 4-byte AS number 334,324 and an assigned number of 132 is represented as target:334324L:132.

In Junos OS Release 9.2 and later, you can also use AS-dot notation when defining a 4-byte AS number for the target and origin extended communities. Specify two integers joined by a period: *16-bit high-order value in decimal.16-bit low-order value in decimal*. For example, the 4-byte AS number represented in plain-number format as 65546 is represented in AS-dot notation as 1.10.

---

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Required Privilege</b> | routing—To view this statement in the configuration.        |
| <b>Level</b>              | routing-control—To add this statement to the configuration. |

|                              |                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Understanding BGP Communities and Extended Communities as Routing Policy Match Conditions</i></li><li>• <i>Understanding How to Define BGP Communities and Extended Communities</i></li><li>• <i>Configuring Routing Policies and Policy Objects in the Dynamic Database</i></li><li>• <i>dynamic-db</i></li></ul> |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## compatibility-mode

|                            |                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>compatibility-mode (adtran   digital-link   kentrox   larscom   verilink) &lt;subrate value&gt;;</code>             |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>e3-options</b> ],<br>[edit interfaces <i>interface-name</i> <b>t3-options</b> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                         |
| <b>Description</b>         | Configure the E3 or T3 interface to be compatible with the channel service unit (CSU) at the remote end of the line.      |



**NOTE:** The `compatibility-mode` statement at the [edit interfaces *interface-name* **e3-options**] hierarchy level is not valid for IQE PICs.

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b> | If you omit this option, the full E3 or T3 rate is used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b> | <p><b>adtran</b>—For T3 IQ interfaces only, configure compatibility with Adtran CSUs.</p> <p><b>digital-link</b>—Configure compatibility with Digital Link CSUs. If you include this option on an E3 interface, you must also disable payload scrambling.</p> <p><b>kentrox</b>—Configure compatibility with Kentrox CSUs. Kentrox subrate is valid for E3 IQ and T3 IQ interfaces only.</p> <p><b>larscom</b>—For T3 and T3 IQ interfaces only, configure compatibility with Larscom CSUs.</p> <p><b>verilink</b>—For T3 IQ and T3 IQE interfaces only, configure compatibility with Verilink CSUs.</p> |



**NOTE:** Verilink configuration is not functional if an IQ interface is paired with an IQE interface.

**subrate value**—Subrate of the E3 or T3 line.

**Range:** For Kentrox CSUs on E3 IQ interfaces and T3 IQ interfaces the subrate value must match the value configured on the CSU. Each increment of the subrate value corresponds to a rate increment of about 0.5 Mbps.

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the E3 CSU Compatibility Mode</i></li> <li>• <i>Configuring the T3 CSU Compatibility Mode</i></li> <li>• <a href="#">payload-scrambler on page 721</a></li> </ul> |

## compression (PPP Properties)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>compression {<br/>    acfc;<br/>    pfc;<br/>}</pre>                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For interfaces with PPP encapsulation, set Link Control Protocol (LCP) compression options.</p> <p>The statements are explained separately.</p>                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PPP Address and Control Field Compression on page 129</a></li><li>• <a href="#">Configuring the PPP Protocol Field Compression on page 131</a></li></ul>                                                                                                                          |

## compression (Voice Services)

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>compression {   rtp {     f-max-period <i>number</i>;     queues [ <i>queue-numbers</i> ];     port {       minimum <i>port-number</i>;       maximum <i>port-number</i>;     }   } }</pre>               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | Configure the compression properties for voice services traffic.<br><br>The remaining statements are described separately.                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                            |

## compression-device

|                                 |                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | compression-device <i>interface-name</i> ;                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                       |
| <b>Description</b>              | Specify the compression interface for voice services traffic.                                                                                                                                           |
| <b>Options</b>                  | <i>interface-name</i> —Logical interface used for compression.                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>               |

## connections

---

|                                 |                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>connections {<br/>  interface-switch connection-name {<br/>    interface interface-name.unit-number;<br/>    interface interface-name.unit-number;<br/>  }<br/>}</pre>                             |
| <b>Hierarchy Level</b>          | [edit protocols]                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                       |
| <b>Description</b>              | Define the connection between two circuits in a circuit cross-connect (CCC) connection.<br><br>The statements are explained separately.                                                                 |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Defining the Connection for Switching Cross-Connects on page 253</a></li><li>• <i>MPLS Applications Feature Guide for Routing Devices</i></li></ul> |

## connection-protection-tlv

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>connection-protection-tlv &lt;using-protection-path   using-working-path&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management]                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | This statement determines which path the connection protection TLV will use. An action profile using "connection-protection-tlv using-protection-path" should apply the statement for a CFM sessions that is monitoring the working path and an action profile using "connection-protection-tlv using-working-path" should apply the command for a CFM session that is monitoring the protection path. Using them in the opposite way could mean drop of service traffic. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">connectivity-fault-management on page 461</a></li><li>• <i>Configuring MAC Flush Message Processing in CET Mode</i></li><li>• <i>Example: Configuring an Action Profile Based on Connection Protection TLVs</i></li></ul>                                                                                                                                                                                             |

## connectivity-fault-management

```

Syntax connectivity-fault-management {
 action-profile profile-name {
 action {
 interface-down;
 log-and-generate-ais {
 interval(1m | 1s);
 level value;
 priority value;
 }
 }
 }
 default-actions {
 interface-down;
 }
 event {
 ais-trigger-condition {
 adjacency-loss;
 all-defects;
 cross-connect-ccm;
 erroneous-ccm;
 receive-ais;
 }
 adjacency-loss;
 interface-status-tlv (down | lower-layer-down);
 port-status-tlv blocked;
 rdi;
 }
 }
 performance-monitoring {
 delegate-server-processing;
 hardware-assisted-timestamping;
 sla-iterator-profiles {
 profile-name {
 avg-fd-twoway-threshold;
 avg-iffdv-twoway-threshold;
 avg-flr-forward-threshold;
 avg-flr-backward-threshold;
 disable;
 calculation-weight {
 delay delay-weight;
 delay-variation delay-variation-weight;
 }
 cycle-time milliseconds;
 iteration-period connections;
 measurement-type (loss | statistical-frame-loss | two-way-delay);
 }
 }
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {

```

```

bridge-domain <vlan-id [vlan-ids]>;
instance routing-instance-name;
interface interface-name;
level number;
name-format (character-string | none | dns | mac+2oct);
maintenance-association ma-name {
 protect-maintenance-association protect-ma-name;
 remote-maintenance-association remote-ma-name;
 short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
 continuity-check {
 convey-loss-threshold;
 hold-interval minutes;
 interface-status-tlv;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number;
 port-status-tlv;
 }
 mep mep-id {
 auto-discovery;
 direction (up | down);
 interface interface-name (protect | working);
 lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
 rem-err-xcon | xcon);
 priority number;
 remote-mep mep-id {
 action-profile profile-name;
 sla-iterator-profile profile-name {
 data-tlv-size size;
 iteration-count count-value;
 priority priority-value;
 detect-loc;
 }
 }
 }
}
virtual-switch routing-instance-name {
 bridge-domain name <vlan-ids [vlan-ids]>;
}
}
no-aggregate-delegate-processing;
}

```

**Hierarchy Level** [edit protocols **oam ethernet**]

**Release Information** Statement introduced in Junos OS Release 8.4.

**Description** For Ethernet interfaces on M7i and M10i routers with Enhanced CFEB (CFEB-E), and on M120, M320, MX Series, and T Series routers, specify connectivity fault management for IEEE 802.1ag Operation, Administration, and Management (OAM) support. In Junos OS Release 9.3 and later, this statement is also supported on aggregated Ethernet interfaces.

The remaining statements are explained separately.



**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *IEEE 802.1ag OAM Connectivity Fault Management Overview*

## container-devices

**Syntax** container-devices {  
device-count *number*;  
}

**Hierarchy Level** [edit chassis]

**Release Information** Statement introduced in Junos OS Release 9.2.

**Description** Specify the container devices configuration. The **number** option specifies the number of sequentially numbered container interfaces, from **ci0** to **ci127** maximum.

**Options** **number**—Number of container devices.  
**Range:** 1 through 128

**Required Privilege Level** chassis—To view this statement in the configuration.  
chassis-control—To add this statement to the configuration.

**Related Documentation**

- *Displaying APS Using a Container Interface with ATM Encapsulation*
- *Configuring Container Interfaces for APS on SONET Links*

## container-list

**Syntax** container-list [ *container-interface-names* ];

**Hierarchy Level** [edit interfaces [container-options](#)]

**Release Information** Statement introduced in Junos OS Release 9.2.

**Description** Specify a list of container interfaces; for example: **ci0**, **ci1**, and up to **ci127**.

**Options** **container-interface-names**—Name of each container interface.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Displaying APS Using a Container Interface with ATM Encapsulation*
- *Configuring Container Interfaces for APS on SONET Links*
- [container-options on page 464](#)

## container-options

---

|                                 |                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>container-options {<br/>  container-list [ container-interface-names ];<br/>  container-type aps;<br/>  member-interface-type sonet {<br/>    member-interface-speed [ speed ];<br/>  }<br/>}</pre>                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces]                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Specify the container interface options.                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>interface-name</b>—Name of the SONET or the container interface.</p> <p><b>aps</b>—Specify the member link interface type of the container as APS.</p> <p><b>sonet</b>—Protocol type of the container interface.</p> <p><b>speed</b>—Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li></ul>                                                                                                            |

## container-type

---

|                                 |                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>container-type aps;</pre>                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">container-options</a> ]                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                       |
| <b>Description</b>              | Specify the container-options interface type.                                                                                                                                                       |
| <b>Options</b>                  | <p><b>aps</b>—Configure the interface type to be Automatic Protection Switching (APS).</p>                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li></ul> |

## continuity-check

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>continuity-check {   convey-loss-threshold;   hold-interval <i>minutes</i>;   interface-status-tlv;   interval (10m   10s   1m   1s  100ms   10ms);   loss-threshold <i>number</i>;   port-status-tlv; }</pre>                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> <b>maintenance-association</b> <i>ma-name</i> ]                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Specify continuity check protocol options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><b>convey-loss-threshold</b>—Enable loss-threshold-tlv transmission.</p> <p><b>hold-interval</b> <i>minutes</i>—Specify the continuity check hold-interval, in minutes.</p> <p><b>interface-status-tlv</b>—Enable interface-status-tlv transmission.</p> <p><b>interval</b> (<i>10m   10s   1m   1s  100ms   10ms</i>)—Specify the continuity check interval.</p> <p><b>loss-threshold</b> <i>minutes</i>—Specify the loss-threshold, in minutes.</p> <p><b>port-status-tlv</b>—Enable port-status-tlv transmission.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring Continuity Check Protocol Parameters for Fault Detection</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               |

## control-channel

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>control-channel <i>channel-name</i> {<br/>    vlan <i>vlan-id</i>;<br/>    interface name <i>interface-name</i><br/>}</code>                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit protocols <b>protection-group ethernet-ring</b> <i>name</i> ( <b>east-interface</b>   <b>west-interface</b> )]                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.                                                                                                                                                                                                           |
| <b>Description</b>              | Configure the Ethernet RPS control channel logical interface to carry the RAPS PDU. The related physical interface is the physical ring port.                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <b>vlan <i>vlan-id</i></b> —If the control channel logical interface is a trunk port, then a dedicated <b>vlan <i>vlan-id</i></b> defines the dedicated VLAN channel to carry the RAPS traffic. Only configure the <b>vlan-id</b> when the control channel logical interface is the trunk port.<br><br><b>interface name <i>interface-name</i></b> —Interface name of the control channel.                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul> |

## control-polarity

---

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | control-polarity (negative   positive);                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | For X.21 interfaces only, configure the control signal polarity.                                                                   |
| <b>Options</b>                  | <p><b>positive</b>—Positive signal polarity.</p> <p><b>negative</b>—Negative signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>               |

## control-signal

---

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | control-signal (assert   de-assert   normal);                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],</p> <p>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]</p>                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                |
| <b>Description</b>              | For X.21 interfaces only, configure the to-DCE signal.                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>assert</b>—The to-DCE signal must be asserted.</p> <p><b>de-assert</b>—The to-DCE signal must be deasserted.</p> <p><b>normal</b>—Normal request-to-send (RTS) signal handling, as defined by ITU-T Recommendation X.21.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                                           |

## copy-tos-to-outer-ip-header

---

|                                 |                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | copy-tos-to-outer-ip-header;                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                        |
| <b>Description</b>              | For GRE tunnel interfaces only, enable the inner IP header's TOS bits to be copied to the outer IP packet header.                                                                                    |
| <b>Default</b>                  | If you omit this statement, the TOS bits in the outer IP header are set to 0.                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Class of Service Feature Guide for Routing Devices</i></li></ul>                                                                                          |

## core-dump

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (core-dump   no-core-dump);                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces mo- <i>fpc/pic/port</i> <b>multiservice-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | <p>For monitoring services interfaces only, a useful tool for isolating the cause of a problem. Core dumping is enabled by default. The directory <b>/var/tmp</b> contains core files. The Junos OS saves the current core file (0) and the four previous core files, which are numbered 1 through 4 (from newest to oldest):</p> <ul style="list-style-type: none"><li>• <b>core-dump</b>—Enable the core dumping operation.</li><li>• <b>no-core-dump</b>—Disable the core dumping operation.</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                            |

## crc-major-alarm-threshold

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | crc-major-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> t1-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Major alarm error thresholds for T1 CRC errors. When the threshold is exceeded for one second, a defect condition is declared. If the defect condition continues for the monitoring period, an alarm condition is declared.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>                  | 10-second monitoring period for all settings except 1e-5. The 1e-5 value uses a 50-second monitoring period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p>1e-3—Error rate expressed as the number of errors per number of bits. The value 1e-3 is one crc error in <math>10^3</math> bits.</p> <p>1e-4—Error rate expressed as the number of errors per number of bits. The value 1e-4 is one crc error in <math>10^4</math> bits.</p> <p>1e-5—Error rate expressed as the number of errors per number of bits. The value 1e-5 is one crc error in <math>10^5</math> bits.</p> <p>5e-4—Error rate expressed as the number of errors per number of bits. The value 5e-4 is five crc errors in <math>10^4</math> bits.</p> <p>5e-5—Error rate expressed as the number of errors per number of bits. The value 5e-5 is five crc errors in <math>10^5</math> bits.</p> <p><b>Default: 5e-5</b></p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring T1 CRC Error Major Alarm Thresholds</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## crc-minor-alarm-threshold

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | crc-minor-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5   5e-6   1e-6);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> t1-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Minor alarm error thresholds for T1 CRC errors. When the threshold is exceeded for one second, a defect condition is declared. If the defect condition continues for the monitoring period, an alarm condition is declared.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>                  | 10-second monitoring period for values <b>1e-3</b> , <b>5e-4</b> , <b>1e-4</b> , and <b>5e-5</b> . The <b>1e-5</b> value uses a 50-second monitoring period. The <b>5e-6</b> value uses a 100-second monitoring period. The <b>1e-6</b> value uses a 500-second monitoring period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>1e-3</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-3</b> is one crc error in <math>10^3</math> bits.</p> <p><b>1e-4</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-4</b> is one crc error in <math>10^4</math> bits.</p> <p><b>1e-5</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-5</b> is one crc error in <math>10^5</math> bits.</p> <p><b>1e-6</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-5</b> is one crc error in <math>10^6</math> bits.</p> <p><b>5e-4</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-4</b> is five crc errors in <math>10^4</math> bits.</p> <p><b>5e-5</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-5</b> is five crc errors in <math>10^5</math> bits.</p> <p><b>5e-6</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-5</b> is five crc errors in <math>10^6</math> bits.</p> <p><b>Default: 5e-6</b></p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring T1 CRC Error Minor Alarm Thresholds</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



## cts

|                                 |                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | cts (ignore   normal   require);                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                      |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, clear-to-send (CTS).                                                                                                                                              |
| <b>Options</b>                  | <p><b>ignore</b>—The from-DCE signal is ignored.</p> <p><b>normal</b>—Normal CTS signal handling as defined by the TIA/EIA Standard 530.</p> <p><b>require</b>—The from-DCE signal must be asserted.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                 |

## cts-polarity

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | cts-polarity (negative   positive);                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | Configure CTS signal polarity.                                                                                                     |
| <b>Options</b>                  | <p><b>positive</b>—Positive signal polarity.</p> <p><b>negative</b>—Negative signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>               |

## cycle-time

---

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>cycle-time cycle-time-value;</code>                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> <a href="#">sla-iterator-profiles</a> <i>profile-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                                                                                       |
| <b>Description</b>              | Configure the time (in milliseconds) taken between back-to-back transmissions of SLA frames for a single connection.                                                                                          |
| <b>Options</b>                  | <b><i>cycle-time-value</i></b> —Cycle time value in milliseconds.<br><b>Range:</b> 10 through 3,600,000<br><b>Default:</b> 1000                                                                               |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li></ul>                                         |

## damping (Interfaces)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>damping {   enable;   half-life <i>seconds</i>;   max-suppress <i>seconds</i>;   reuse <i>number</i>;   suppress <i>number</i>; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>     | <a href="#">[edit interfaces on page 356 interface--name]</a> ,<br><a href="#">[edit interfaces on page 356 interface--range]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 14.1 for PTX Series Packet Transport Routers and T Series Core Routers.</p> <p>Statement introduced in Junos OS Release 14.2 for MX960, MX480, MX240, and MX80 3D Universal Edge Routers and M10i Multiservice Edge Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>         | <p>Limit the number of advertisements of the up and down transitions (flapping) on an interface. Each time a transition occurs, the interface state is changed, which generates an advertisement to the upper-level routing protocols. Damping helps reduce the number of these advertisements. Every time an interface goes down, a penalty is added to the interface penalty counter. Penalty added on every interface flap is 1000.</p> <p>If at some point the accumulated penalty exceeds the suppress level <b>max-suppress</b>, the interface is placed in the suppress state, and further interface state up and down transitions are not reported to the upper-level protocols.</p> |
| <b>Options</b>             | <p><b>enable</b>—Enable damping on a per-interface basis. If damping is enabled on an interface, it is suppressed during interface flaps that match the configuration settings.</p> <p><b>Default:</b> Disabled</p> <p><b>half-life <i>seconds</i></b>—Decay half-life. <b><i>seconds</i></b> is the interval after which the accumulated interface penalty counter is reduced by half if the interface remains stable.</p>                                                                                                                                                                                                                                                                  |



**NOTE:** For the half-life, configure a value that is less than the max-suppress value. If you do not, the configuration is rejected.

**Range:** 1 through 30

**Default:** 5

**max-suppress *seconds***—Maximum hold-down time. ***seconds*** is the maximum time that an interface can be suppressed no matter how unstable the interface has been.



**NOTE:** For max-suppress, configure a value that is greater than the half-life. If you do not, the configuration is rejected.

**Range:** 1 through 20,000

**Default:** 20

**reuse *number***—Reuse threshold. When the accumulated interface penalty counter falls below *number*, the interface is no longer suppressed.

**Range:** 1 through 20,000

**Default:** 1000

**suppress *number***—Cutoff (suppression) threshold. When the accumulated interface penalty counter exceeds *number*, the interface is suppressed.

**Range:** 1 through 20,000

**Default:** 2000

|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration. |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|

|                              |                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">Physical Interface Damping Overview on page 139</a></li><li>• <a href="#">Damping Shorter Physical Interface Transitions on page 145</a></li><li>• <a href="#">Damping Longer Physical Interface Transitions on page 146</a></li><li>• <a href="#">show interfaces extensive on page 1293</a></li><li>• <a href="#">hold-time on page 577</a></li></ul> |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## data-channel

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | data-channel {<br>vlan <i>number</i> ;<br>}                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ]                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.                                                                                                                                                                                                                                                |
| <b>Description</b>              | For Ethernet ring protection, configure a data channel to define a set of VLAN IDs that belong to a ring instance.<br><br>VLANs specified in the data channel use the same topology used by the ERPS PDU in the control channel. Therefore, if a ring interface is blocked in the control channel, all traffic in the data channel is also blocked on that interface.                                                                                  |
| <b>Options</b>                  | <b>vlan <i>number</i></b> —Specify (by VLAN ID) one or more VLANs that belong to a ring instance.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li> <li>• <i>Example: Configuring Load Balancing Within Ethernet Ring Protection for MX Series Routers</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul> |

## data-tlv-size

---

|                     |                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax              | <code>data-tlv-size size;</code>                                                                                                                                                                                                                                                                                                                                 |
| Hierarchy Level     | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">maintenance-domain</a> <i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> <a href="#">remote-mep</a> <i>remote-mep-id</i> <a href="#">sla-iterator-profile</a> <i>profile-name</i> ] |
| Release Information | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                                   |
| Description         | Configure the size of the data TLV portion of the Y.1731 data frame.                                                                                                                                                                                                                                                                                             |
| Options             | <i>size</i> —Size of the data TLV portion of the Y.1731 data frame.                                                                                                                                                                                                                                                                                              |



**NOTE:** This option is applicable only for two-way delay measurement.

---

**Range:** 1 through 1400 bytes

**Default:** 1

|                          |                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required Privilege Level | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                        |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">sla-iterator-profile on page 847</a></li><li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li></ul> |

## dcd

|                                 |                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dcd (ignore   normal   require);                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                      |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, data-carrier-detect (DCD).                                                                                                                                        |
| <b>Options</b>                  | <p><b>ignore</b>—The from-DCE signal is ignored.</p> <p><b>normal</b>—Normal DCD signal handling as defined by the TIA/EIA Standard 530.</p> <p><b>require</b>—The from-DCE signal must be asserted.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                 |

## dcd-polarity

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dcd-polarity (negative   positive);                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | Configure DCD signal polarity.                                                                                                     |
| <b>Options</b>                  | <p><b>positive</b>—Positive signal polarity.</p> <p><b>negative</b>—Negative signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>               |

## dce

---

|                                 |                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dce;                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>serial-options</b> <b>clocking-mode</b> ]                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                         |
| <b>Description</b>              | For Frame Relay only, respond to status enquiry message keepalives.<br><br>When you configure the router to be a DCE, keepalives are disabled by default. |
| <b>Default</b>                  | The router operates in DTE mode.                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Router as a DCE with Frame Relay Encapsulation on page 134</a></li></ul>              |

## default-actions

---

|                                 |                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | default-actions {<br><b>interface-down</b> ;<br>}                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet <b>connectivity-fault-management</b> <b>action-profile</b> <i>profile-name</i> ]                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                            |
| <b>Description</b>              | Define the action to be taken when connectivity to the remote MEP is lost.                                                               |
| <b>Default</b>                  | If no action is configured, no action is taken.                                                                                          |
| <b>Options</b>                  | <b>interface-down</b> —When a remote MEP connectivity failure is detected, bring the interface down.                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a CFM Action Profile to Specify CFM Actions for CFM Events</a></li></ul> |



## default-chap-secret

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>default-chap-secret name;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ppp-options <a href="#">chap</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options <a href="#">chap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ppp-options <a href="#">chap</a> ]                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.0.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Define the default CHAP secret to be used when no matching CHAP access profile exists.</p> <p>For ATM2 IQ interfaces only, you can configure a default CHAP secret on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul> |
| <b>Default</b>                  | If you do not include the <b>default-chap-secret</b> statement in the configuration, and an interface receives a CHAP challenge or response from a peer that is not in the applied access profile, the link is immediately dropped.                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Default CHAP Secret on page 123</a></li> <li>• <a href="#">access-profile on page 388</a></li> </ul>                                                                                                                                                                                                                                                                                                                    |

## default-pap-password

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>default-pap-password password;</code>                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options pap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options pap</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                    |
| <b>Description</b>              | For PAP authentication, the default PAP password.                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Default PAP Password on page 176</a></li> <li>• <a href="#">access-profile on page 388</a></li> </ul>                                                                                                         |


## delimiter

---

|                                 |                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>delimiter <i>delimiter-character</i>;</code>                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                      |
| <b>Description</b>              | Specify the character used as the delimiter between the concatenated components of the username. You cannot use the semicolon (;) as a delimiter.                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring VLAN Interface Username Information for AAA Authentication</a></li></ul>                                                                                                            |

## demux-destination (Underlying Interface)

---

|                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                          | <code>demux-destination <i>family</i>;</code>                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                 | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>                                                                                                                                                                                                                                             | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.                                                                                                                                                                                                                                                         |
| <b>Description</b>                                                                                                                                                                                                                                                     | Configure the logical demultiplexing (demux) destination family type on the IP demux underlying interface.                                                                                                                                                                                                                                                              |
| <div> <b>NOTE:</b> The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.</div> |                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                        | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li><li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li></ul>                                                                                                                                                              |

## demux-destination (Demux Interface)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>demux-destination {<br/>    <code>destination-prefix</code>;<br/>}</code>                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure one or more logical demultiplexing (demux) destination prefixes. The prefixes are matched against the destination address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li> <li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li> </ul>                                                                                                                                                                                                                          |

## demux-options (Static Interface)

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>demux-options {<br/>    <code>underlying-interface</code> <i>interface-name</i><br/>}</code>                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                 |
| <b>Description</b>              | Configure logical demultiplexing (demux) interface options.<br><br>The statement is explained separately.                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li> <li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li> </ul> |

## demux-source (Demux Interface)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>demux-source {<br/>    source-prefix;<br/>}</code>                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure one or more logical demultiplexing (demux) source prefixes. The prefixes are matched against the source address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li><li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li></ul>                                                                                                                                                                                                                             |

## demux-source (Underlying Interface)

|                            |                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>demux-source <i>family</i>;</code>                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.                                                                                                                                                                                                                                                         |
| <b>Description</b>         | Configure the logical demultiplexing (demux) source family type on the IP demux underlying interface.                                                                                                                                                                                                                                                                   |



**NOTE:** The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <i>family</i> —Protocol family: <ul style="list-style-type: none"> <li>• <b>inet</b>—Internet Protocol version 4 suite</li> <li>• <b>inet6</b>—Internet Protocol version 6 suite</li> </ul>                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li> <li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li> </ul> |

## demux0 (Static Interface)

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>demux0 {     unit <i>logical-unit-number</i> {         demux-options {             underlying-interface <i>interface-name</i>         }         family <i>family</i> {             access-concentrator <i>name</i>;             {                 destination-prefix;             }             direct-connect;             duplicate-protection;             dynamic-profile <i>profile-name</i>;             {                 source-prefix;             }             max-sessions <i>number</i>;             service-name-table <i>table-name</i>             targeted-distribution;             unnumbered-address <i>interface-name</i> &lt;preferred-source-address <i>address</i>&gt;;         }         vlan-id <i>number</i>;         vlan-tags outer [<i>tpid</i>].<i>vlan-id</i> [inner [<i>tpid</i>].<i>vlan-id</i>];     } }</pre> |
| Hierarchy Level          | [edit interfaces],<br>[edit logical-systems <i>logical-system-name</i> interfaces]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Release Information      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Description              | <p>Configure the logical demultiplexing (demux) interface.</p> <p>Logical IP demux interfaces do not support IPv4 and IPv6 dual stack.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li><li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## demux0 (Dynamic Interface)

```
Syntax demux0 {
 unit logical-unit-number {
 demux-options {
 underlying-interface interface-name
 }
 family family {
 access-concentrator name;
 address address;
 demux-source {
 source-prefix;
 }
 direct-connect;
 duplicate-protection;
 dynamic-profile profile-name;
 filter {
 input filter-name;
 output filter-name;
 }
 mac-validate (loose | strict);
 max-sessions number;
 max-sessions-vsa-ignore;
 rpf-check {
 fail-filter filter-name;
 mode loose;
 }
 service-name-table table-name
 short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
 maximum-seconds>;
 unnumbered-address interface-name <preferred-source-address address>;
 }
 filter {
 input filter-name;
 output filter-name;
 }
 vlan-id number;
 }
 }
```

**Hierarchy Level** [edit **dynamic-profiles** *profile-name* **interfaces**]

**Release Information** Statement introduced in Junos OS Release 9.3.

**Description** Configure the logical demultiplexing (demux) interface in a dynamic profile.

Logical IP demux interfaces do not support IPv4 and IPv6 dual stack.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

- Related Documentation**
- *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
  - [Demultiplexing Interface Overview on page 273](#)

---

## description

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | description text;                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | <p>Provide a textual description of the interface or the logical unit. Any descriptive text you include is displayed in the output of the <b>show interfaces</b> commands, and is also exposed in the <b>ifAlias</b> Management Information Base (MIB) object. It has no effect on the operation of the interface on the router or switch.</p> <p>The textual description can also be included in the extended DHCP relay option 82 Agent Circuit ID suboption.</p> |
| <b>Options</b>                  | <b>text</b> —Text to describe the interface. If the text includes spaces, enclose the entire text in quotation marks.                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Adding an Interface Description to the Configuration</i></li><li>• <a href="#">Adding a Logical Unit Description to the Configuration on page 168</a></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Using DHCP Relay Agent Option 82 Information</i></li></ul>                                                                                                                   |



## destination (IPCP)

|                                 |                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>destination address <a href="#">destination-profile</a> profile-name;</code>                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet unnumbered-address <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet unnumbered-address <i>interface-name</i> ]                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For unnumbered interfaces with PPP encapsulation, specify the IP address of the remote interface.                                                                                                                                                                                                                            |
| <b>Options</b>                  | <b>address</b> —IP address of the remote interface.<br><br>The remaining statement is explained separately.                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options for Interfaces with PPP Encapsulation on page 193</a></li> <li>• <a href="#">address on page 397</a></li> <li>• <a href="#">negotiate-address on page 704</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul> |

## destination (Routing Instance)

|                                 |                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>destination routing-instance-name;</code>                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> tunnel routing-instance],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> tunnel routing-instance] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                              |
| <b>Description</b>              | Specify the destination routing instance that points to the routing table containing the tunnel destination address.                                                                                                                                                           |
| <b>Default</b>                  | The default Internet routing table <b>inet.0</b> .                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                            |

## destination (Tunnels)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>destination address;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <i>family</i> inet address <i>address</i>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <i>family</i> inet <i>unnumbered-address</i></code><br><code>    <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> <i>unit logical-unit-number</i> tunnel],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code>    <i>family</i> inet address <i>address</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code>    <i>family</i> inet <i>unnumbered-address</i> <i>interface-name</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <i>unit logical-unit-number</i></code><br><code>    tunnel]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | For encrypted, PPP-encapsulated, and tunnel interfaces, specify the remote address of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <i>address</i> —Address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Address on page 187</a></li><li>• <i>Configuring Generic Routing Encapsulation Tunneling (CLI Procedure)</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">point-to-point on page 765</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## destination-class-usage

|                                 |                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>destination-class-usage;</code>                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Enable packet counters on an interface that count packets that arrive from specific customers and are destined for specific prefixes on the provider core router.                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 235</a></li> <li>• <a href="#">accounting on page 389</a></li> <li>• <a href="#">source-class-usage on page 853</a></li> </ul>                                     |

## destination-profile

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>destination-profile <i>name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet unnumbered-address <i>interface-name</i> destination <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet unnumbered-address <i>interface-name</i> destination <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For interfaces with PPP encapsulation, assign PPP properties to the remote destination end. You define the profile at the <b>[edit access group-profile <i>name</i> ppp]</b> hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <b><i>name</i></b> —Profile name defined at the <b>[edit access group-profile <i>name</i> ppp]</b> hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options for Interfaces with PPP Encapsulation on page 193</a></li> <li>• <a href="#">destination (IPCP) on page 487</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                          |

## dial-options

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>dial-options {<br/>    ipsec-interface-id <i>name</i>;<br/>    l2tp-interface-id <i>name</i>;<br/>    (shared   dedicated);<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>sp-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit interfaces <i>si-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>sp-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>si-fpc/pic/port</i> unit <i>logical-unit-number</i>]</pre>                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>The <b>[edit ...si-...]</b> hierarchy levels introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Specify the options for configuring logical interfaces for group and user sessions in L2TP or IPsec dynamic endpoint tunneling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>dedicated</b>—(LNS on M Series routers and MX Series routers only) Specify that a logical interface can host only one session at a time.</p> <p><b>ipsec-interface-id <i>name</i></b>—(M Series routers only) Interface identifier for group of dynamic peers. This identifier must be replicated at the <b>[edit access profile <i>name</i> client * ike]</b> hierarchy level.</p> <p><b>l2tp-interface-id <i>name</i></b>—Interface identifier that must be replicated at the <b>[edit access profile <i>name</i>]</b> hierarchy level.</p> <p><b>shared</b>—(LNS on M Series routers only) Specify that a logical interface can host multiple (shared) sessions at a time.</p> |
| <b>Required Privilege Level</b> | <p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Identifier for Logical Interfaces that Provide L2TP Services</i></li><li>• <i>Configuring Dynamic Endpoints for IPsec Tunnels</i></li><li>• <i>Configuring Options for the LNS Inline Services Logical Interface</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                               |

## dialer

---

|                                 |                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dialer <i>filter-name</i>;</code>                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                        |
| <b>Description</b>              | Apply a dialer filter to an interface. To create the dialer filter, include the <b>dialer-filter</b> statement at the [edit firewall filter family <i>family</i> ] hierarchy level.                                                                      |
| <b>Options</b>                  | <i>filter-name</i> —Dialer filter name.                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying the Dial-on-Demand Dialer Filter to the Dialer Interfaces</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>                                                      |

## dialer-options

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>dialer-options {<br/>  activation-delay <i>seconds</i>;<br/>  callback;<br/>  callback-wait-period <i>time</i>;<br/>  deactivation-delay <i>seconds</i>;<br/>  dial-string [ <i>dial-string-numbers</i> ];<br/>  idle-timeout <i>seconds</i>;<br/>  incoming-map {<br/>    caller <i>caller-number</i>   accept-all;<br/>    initial-route-check <i>seconds</i>;<br/>    load-interval <i>seconds</i>;<br/>    load-threshold <i>percent</i>;<br/>    pool <i>pool-name</i>;<br/>    redial-delay <i>time</i>;<br/>    watch-list {<br/>      [ <i>routes</i> ];<br/>    }<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces umd0],<br/>[edit interfaces dln unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces dln unit <i>logical-unit-number</i>]</pre>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>Specify the dialer options for configuring logical interfaces for group and user sessions.</p> <p>The statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Logical Interface Properties</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |

## direction

|                            |                                                                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | direction (up   down);                                                                                                                                                      |
| <b>Hierarchy Level</b>     | [edit protocols <b>oam ethernet connectivity-fault-management</b> maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <b>mep</b> <i>mep-id</i> ]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.4.                                                                                                                               |
| <b>Description</b>         | Configure the direction of the MEP.                                                                                                                                         |
| <b>Options</b>             | <b>up</b> —An UP MEP CCM is transmitted out of every logical interface which is part of the same bridging or vpls instance except for the interface configured on this MEP. |



**NOTE:** The up direction for MEP is not supported on T Series routers.

**down**—Down MEP CCMs are transmitted only out the interface configured on this MEP.

|                                 |                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li> <li>• <i>IEEE 802.1ag OAM Connectivity Fault Management Overview</i></li> </ul> |

## disable (Interface)

|                            |                                                                                                                                                                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | disable;                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                  |
| <b>Description</b>         | Disable a physical or a logical interface, effectively unconfiguring it.                                                                                                                                                                             |



### CAUTION:

- Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.
- If aggregated SONET links are configured between a T1600 router and a T4000 router, interface traffic is disrupted when you disable the physical interface configured on the T1600 router. If you want to remove the interface, we recommend that you deactivate the interface instead of disabling it.



### NOTE:

- When you use the disable statement at the [edit interfaces] hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet (GE) PICs with SFP and XFP transceivers and ATM MIC with SFP do support it and the laser will be turned off when the interface is disabled. If the ATM MIC with SFP is part of an APS group, then the laser will not be turned off when you use the disable statement at the [edit interfaces] hierarchy level..
- When you disable or deactivate an interface, then all the references made to the deactivated interface must be removed from the routing instance.



**WARNING:** Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.



**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Disabling a Physical Interface on page 153](#)
- [Disabling a Logical Interface on page 180](#)

## disable (Link Protection)

**Syntax** disable;

**Hierarchy Level** [edit interfaces aeX aggregated-ether-options lacp link-protection]

**Release Information** Statement introduced in Junos OS Release 9.3.  
Statement introduced in Junos OS Release 11.4 for EX Series switches.

**Description** Disable LACP link protection on the interface.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring LACP for Aggregated Ethernet Interfaces*
- *Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)*

## disable-mlppp-inner-ppp-pfc

**Syntax** disable-mlppp-inner-ppp-pfc;

**Hierarchy Level** [edit interfaces *interface-name* [unit](#) *logical-unit-number*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* [unit](#) *logical-unit-number*]

**Release Information** Statement introduced in Junos OS Release 8.2.

**Description** For MLPPP interfaces only, disable compression of the inner PPP header in the MLPPP payload. By default, compression is enabled.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Junos OS Services Interfaces Library for Routing Devices*

## dlci

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dlci <i>dlci-identifier</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>For Frame Relay and Multilink Frame Relay (MLFR) user-to-network interface (UNI) network-to-network interface (NNI) encapsulation only, and for link services, voice services and point-to-point interfaces only, configure the data-link connection identifier (DLCI) for a permanent virtual circuit (PVC) or an switched virtual circuit (SVC).</p> <p>To configure a DLCI for a point-to-multipoint interface, use the <b>multipoint-destination</b> statement to specify the DLCI.</p> |
| <b>Options</b>                  | <p><b><i>dlci-identifier</i></b>—Data-link connection identifier.</p> <p><b>Range:</b> 16 through 1022.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Data-Link Connection Identifiers on Channelized Interfaces</i></li><li>• <i>Configuring Frame Relay DLCIs</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">encapsulation (Logical Interface) on page 522</a></li><li>• <a href="#">multicast-dlci on page 690</a></li><li>• <a href="#">multipoint-destination on page 694</a></li></ul>                                                         |

## do-not-fragment

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>do-not-fragment;</code>                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 15.1X53-D10 for QFX10000 switches.                                                                                   |
| <b>Description</b>              | Disable fragmentation of GRE encapsulated packets. Set the do-not-fragment (DF) bit on the packets entering the GRE tunnel so that they do not get fragmented anywhere in the path.                            |
| <b>Default</b>                  | By default, fragmentation is disabled.                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>reassemble-packets</i></li> <li>• <i>Configuring Unicast Tunnels</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>         |

## domain-name

|                                 |                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>domain-name <i>domain-name-string</i>;</code>                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <i>vlan-ranges authentication username-include</i> ],<br>[edit interfaces <i>interface-name</i> auto-configure <i>stacked-vlan-ranges authentication username-include</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                    |
| <b>Description</b>              | Specify the domain name that is concatenated with the username during the subscriber authentication process.                                                                                                                      |
| <b>Options</b>                  | <i>domain-name-string</i> —The domain name formatted string.                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li> </ul>                                                                                                 |

## dot1x

---

**Syntax**

```
dot1x {
 authenticator {
 authentication-profile-name access-profile-name;
 interface interface-id {
 maximum-requests integer;
 quiet-period seconds;
 reauthentication (disable | interval seconds);
 retries integer;
 server-timeout seconds;
 supplicant (single);
 supplicant-timeout seconds;
 transmit-period seconds;
 }
 }
}
```

**Hierarchy Level** [edit protocols]

**Release Information** Statement introduced in Junos OS Release 9.3.

**Description** For the MX Series only, specifies settings for using 802.1x Port-Based Network Access Control.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *IEEE 802.1x Port-Based Network Access Control Overview*
- [authenticator on page 420](#)
- [authentication-profile-name on page 419](#)
- [interface \(IEEE 802.1x\) on page 604](#)

## down-count

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>down-count <i>cells</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> <b>oam-liveness</b>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>oam-liveness</b>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>address</b> <i>address</i> multipoint-destination <i>address</i> <b>oam-liveness</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>oam-liveness</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>address</b> <i>address</i> multipoint-destination <i>address</i> <b>oam-liveness</b>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. This feature is not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the [edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>] hierarchy level.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells lost before a VC is declared down.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the ATM OAM F5 Loopback Cell Threshold</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## drop (PPPoE Service Name Tables)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | drop;                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> <b>service</b> <i>service-name</i> ],<br>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b><br><i>aci circuit-id-string ari remote-id-string</i> ]                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Support at [edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b> <i>aci circuit-id-string ari remote-id-string</i> ] hierarchy level introduced in Junos OS Release 10.2.                                                                                                                                                     |
| <b>Description</b>              | Direct the router to drop (ignore) a PPPoE Active Discovery Initiation (PADI) control packet received from a PPPoE client that contains the specified service name tag or agent circuit identifier/agent remote identifier (ACI/ARI) information. This action effectively denies the client's request to provide the specified service, or to accept requests from the subscriber or subscribers represented by the ACI/ARI information. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li></ul>                                                                                                                                                                                                                                                                                                                                           |

## drop-timeout

---

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | drop-timeout <i>milliseconds</i> ;                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>mlfr-uni-nni-bundle-options</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                |
| <b>Description</b>              | For link services, multilink, and voice services interfaces only, configure the drop timeout period, in milliseconds.                                                                                                                                                            |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —Drop timeout period.<br><b>Range:</b> 0 through 2000 milliseconds<br><b>Default:</b> 0 ms (disabled)                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                |

## ds0-options

|                                 |                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>ds0-options {   bert-algorithm <i>algorithm</i>;   bert-error-rate <i>rate</i>;   bert-period <i>seconds</i>;   byte-encoding (nx56   nx64);   fcs (16   32);   idle-cycle-flag (flags   ones);   invert-data;   loopback <i>payload</i>;   start-end-flag (filler   shared); }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                          |
| <b>Description</b>              | <p>Configure DS0-specific physical interface properties.</p> <p>The statements are explained separately.</p>                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Channelized DS3-to-DS0 Interfaces</i></li> </ul>                                                                                                                                                                                   |

## dsr

---

|                                 |                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dsr (ignore   normal   require);</code>                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                              |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, data-set-ready (DSR).                                                                                                                                     |
| <b>Options</b>                  | <b>ignore</b> —The from-DCE signal is ignored.<br><br><b>normal</b> —Normal DSR signal handling as defined by the TIA/EIA Standard 530.<br><br><b>require</b> —The from-DCE signal must be asserted.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li></ul>                                                                                                           |

## dsr-polarity

---

|                                 |                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dsr-polarity (negative   positive);</code>                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                        |
| <b>Description</b>              | Configure DSR signal polarity.                                                                                           |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li></ul>       |



## dte-options

|                                 |                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> dte-options {   control-signal (assert   de-assert   normal);   cts (ignore   normal   require);   dcd (ignore   normal   require);   dsr (ignore   normal   require);   dtr signal-handling-option;   ignore-all;   indication (ignore   normal   require);   rts (assert   de-assert   normal);   tm (ignore   normal   require); } </pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement previously known as <b>control-leads</b> .                                                                                                                                                                                                                                              |
| <b>Description</b>              | For M Series and T Series routers, configure the serial interface signal characteristics.<br><br>The statements are explained separately.                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                                                                                                                             |

## dtr

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dtr <i>signal-handling-option</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the to-DCE signal, data-transmit-ready (DTR).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b><i>signal-handling-option</i></b>—Signal handling for the DTR signal. The signal handling can be one of the following:</p> <p><b>assert</b>—The to-DCE signal must be asserted.</p> <p><b>auto-synchronize</b>—Normal DTR signal with automatic synchronization. This statement has two substatements:</p> <p><b>duration <i>milliseconds</i></b>—Pulse duration of resynchronization.<br/><b>Range:</b> 1 through 1000 milliseconds<br/><b>Default:</b> 1000 milliseconds</p> <p><b>interval <i>seconds</i></b>—Offset interval for resynchronization.<br/><b>Range:</b> 1 through 31 seconds<br/><b>Default:</b> 15 seconds</p> <p><b>de-assert</b>—The to-DCE signal must be deasserted.</p> <p><b>normal</b>—Normal DTR signal handling as defined by the TIA/EIA Standard 530.<br/><b>Default:</b> <b>normal</b></p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## dtr-circuit

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dtr-circuit (balanced   unbalanced);                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure a DTR circuit.                                                          |
| <b>Options</b>                  | <b>balanced</b> —Balanced DTR signal.<br><b>unbalanced</b> —Unbalanced DTR signal.<br><b>Default:</b> balanced          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial DTR Circuit on page 305</a></li> </ul>      |

## dtr-polarity

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dtr-polarity (negative   positive);                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Configure DTR signal polarity.                                                                                          |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>    |

## dump-on-flow-control

---

|                                 |                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dump-on-flow-control;                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> multiservice-options]                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                                             |
| <b>Description</b>              | This option supports high availability functionality and can be used with various service interfaces, including <b>rsp</b> , <b>rms</b> , <b>lsq</b> , and <b>rlsq</b> .                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">passive-monitor-mode on page 751</a></li></ul> |

## dynamic-profile (PPP)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dynamic-profile <i>profile-name</i> ;                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options]                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support for MLPPP on LSQ interfaces introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Specify the dynamic profile that is attached to the interface. On the MX Series routers, this statement is supported on PPPoE interfaces only.                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Dynamic Profiles Overview</i></li><li>• <i>Configuring a Basic Dynamic Profile</i></li><li>• <i>Attaching Dynamic Profiles to Static PPP Subscriber Interfaces</i></li><li>• <i>Attaching Dynamic Profiles to MLPPP Bundles</i></li><li>• For hardware requirements, see <i>Hardware Requirements for PPP Subscriber Services on Non-Ethernet Interfaces</i></li></ul> |

## dynamic-profile (PPPoE Service Name Tables)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dynamic-profile <i>profile-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <code>[edit protocols pppoe service-name-tables <i>table-name</i> <i>service</i> <i>service-name</i>],</code><br><code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <i>agent-specifier</i></code><br><code>aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>Specify a dynamic profile to instantiate a dynamic PPPoE interface. You can associate a dynamic profile with a named service entry, <b>empty</b> service entry, or <b>any</b> service entry configured in a PPPoE service name table, or with an agent circuit identifier/agent remote identifier (ACI/ARI) pair defined for these services.</p> <p>The dynamic profile associated with a service entry in a PPPoE service name table overrides the dynamic profile associated with the PPPoE underlying interface on which the dynamic PPPoE interface is created.</p> <p>If you include the <b>dynamic-profile</b> statement at the <code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <i>agent-specifier</i> aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code> hierarchy level, you cannot also include the <b>static-interface</b> statement at this level. The <b>dynamic-profile</b> and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| <b>Options</b>                  | <b><i>profile-name</i></b> —Name of the dynamic profile that the router uses to instantiate a dynamic PPPoE interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring PPPoE Service Name Tables</i></li> <li><i>Assigning a Dynamic Profile and Routing Instance to a Service Name or ACI/ARI Pair for Dynamic PPPoE Interface Creation</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## dynamic-profile (Stacked VLAN)

---

|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>dynamic-profile <i>profile-name</i> {<br/>    <b>accept</b> (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);<br/>    <b>ranges</b> (any   <i>low-tag-high-tag</i>),(any   <i>low-tag-high-tag</i>);<br/>}</code>                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>auto-configure stacked-vlan-ranges</b> ]                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                   |
| <b>Description</b>              | Configure a dynamic profile for use when configuring dynamic stacked VLANs.                                                                                                                                                                     |
| <b>Options</b>                  | <p><b><i>profile-name</i></b>—Name of the dynamic profile that you want to use when configuring dynamic stacked VLANs.</p> <p>The remaining statements are explained separately.</p>                                                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Dynamic Profiles Overview</i></li><li>• <i>Configuring a Basic Dynamic Profile</i></li><li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs</i></li></ul> |

## dynamic-profile (VLAN)

|                                 |                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dynamic-profile <i>profile-name</i> {<br>accept (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);<br>ranges (any   low-tag)–(any   high-tag);<br>}                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure vlan-ranges]                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                          |
| <b>Description</b>              | Configure a dynamic profile for use when configuring dynamic VLANs.                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b><i>profile-name</i></b>—Name of the dynamic profile that you want to use when configuring dynamic VLANs.</p> <p>The remaining statements are explained separately.</p>                                                                           |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Dynamic Profiles Overview</i></li> <li>• <i>Configuring a Basic Dynamic Profile</i></li> <li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs</i></li> </ul> |

## dynamic-profiles

```

Syntax dynamic-profiles {
 profile-name {
 class-of-service {
 interfaces {
 interface-name ;
 }
 unit logical-unit-number {
 classifiers {
 type (classifier-name | default);
 }
 output-traffic-control-profile (profile-name | $junos-cos-traffic-control-profile);
 rewrite-rules {
 dscp (rewrite-name | default);
 dscp-ipv6 (rewrite-name | default);
 ieee-802.1 (rewrite-name | default) vlan-tag (outer | outer-and-inner);
 inet-precedence (rewrite-name | default);
 }
 }
 }
 }
 scheduler-maps {
 map-name {
 forwarding-class class-name scheduler scheduler-name;
 }
 }
 schedulers {
 (scheduler-name) {
 buffer-size (seconds | percent percentage | remainder | temporal microseconds);
 drop-profile-map loss-priority (any | low | medium-low | medium-high | high)
 protocol (any | non-tcp | tcp) drop-profile profile-name;
 excess-priority (low | high | $junos-cos-scheduler-excess-priority);
 excess-rate (percent percentage | percent $junos-cos-scheduler-excess-rate);
 overhead-accounting (shaping-mode) <bytes (byte-value)>;
 priority priority-level;
 shaping-rate (rate | predefined-variable);
 transmit-rate (percent percentage | rate | remainder) <exact | rate-limit>;
 }
 }
 traffic-control-profiles profile-name {
 delay-buffer-rate (percent percentage | rate | $junos-cos-delay-buffer-rate);
 excess-rate (percent percentage | proportion value | percent $junos-cos-excess-rate);
 guaranteed-rate (percent percentage | rate | $junos-cos-guaranteed-rate);
 overhead-accounting (shaping-mode) <bytes (byte-value)>;
 scheduler-map map-name;
 shaping-rate (rate | predefined-variable);
 }
 }
 firewall {
 family family {
 fast-update-filter filter-name {
 interface-specific;
 match-order [match-order];
 }
 }
 }

```



```

 term term-name {
 from {
 match-conditions;
 }
 then {
 action;
 action-modifiers;
 }
 only-at-create;
 }
}
filter filter-name {
 enhanced-mode-override;
 fast-lookup-filter;
 instance-shared;
 interface-shared;
 interface-specific;
 term term-name {
 from {
 match-conditions;
 }
 then {
 action;
 action-modifiers;
 }
 }
}
}
hierarchical-policer uid {
 aggregate {
 if-exceeding {
 bandwidth-limit-limit bps;
 burst-size-limit bytes;
 }
 then {
 policer-action;
 }
 }
}
premium {
 if-exceeding {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 then {
 policer-action;
 }
}
}
policer uid {
 filter-specific;
 if-exceeding {
 (bandwidth-limit bps | bandwidth-percent percentage);
 burst-size-limit bytes;
 }
 logical-bandwidth-policer;
 logical-interface-policer;
}

```

```
 physical-interface-policer;
 then {
 policer-action;
 }
}
three-color-policer uid {
 action {
 loss-priority high then discard;
 }
 logical-interface-policer;
 single-rate {
 (color-aware | color-blind);
 committed-burst-size bytes;
 committed-information-rate bps;
 excess-burst-size bytes;
 }
 two-rate {
 (color-aware | color-blind);
 committed-burst-size bytes;
 committed-information-rate bps;
 peak-burst-size bytes;
 peak-information-rate bps;
 }
}
}
}
policy-options {
 prefix-list uid {
 ip-addresses;
 dynamic-db;
 }
}
interfaces interface-name {
 interface-set interface-set-name {
 interface interface-name {
 unit logical unit number {
 advisory-options {
 downstream-rate rate;
 upstream-rate rate;
 }
 }
 }
 }
}
unit logical-unit-number {
 auto-configure {
 agent-circuit-identifier {
 dynamic-profile profile-name;
 }
 }
}
```

```

encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-cisco-nlpid |
 atm-tcc-vc-mux | atm-mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux |
 atm-snap | atm-tcc-snap | atm-vc-mux | ether-over-atm-llc |
 ether-vpls-over-atm-llc | ether-vpls-over-fr | ether-vpls-over-ppp | ethernet |
 frame-relay-ccc | frame-relay-ppp | frame-relay-tcc | frame-relay-ether-type |
 frame-relay-ether-type-tcc | multilink-frame-relay-end-to-end | multilink-ppp |
 ppp-over-ether | ppp-over-ether-over-atm-llc | vlan-bridge | vlan-ccc | vlan-vci-ccc
 | vlan-tcc | vlan-vpls);
family family {
 address address;
 filter {
 adf {
 counter;
 input-precedence precedence;
 not-mandatory;
 output-precedence precedence;
 rule rule-value;
 }
 input filter-name (
 precedence precedence;
 shared-name filter-shared-name;
)
 output filter-name {
 precedence precedence;
 shared-name filter-shared-name;
 }
 }
}
rpf-check {
 fail-filter filter-name;
 mode loose;
}
service {
 input {
 service-set service-set-name {
 service-filter filter-name;
 }
 post-service-filter filter-name;
 }
 input-vlan-map {
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 (push | swap);
 tag-protocol-id tpid;
 vlan-id number;
 }
 output {
 service-set service-set-name {
 service-filter filter-name;
 }
 }
 output-vlan-map {
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 (pop | swap);
 tag-protocol-id tpid;
 vlan-id number;
 }
}

```

```
 }
 }
 unnumbered-address interface-name <preferred-source-address address>;
}
filter {
 input filter-name (
 shared-name filter-shared-name;
)
 output filter-name {
 shared-name filter-shared-name;
 }
}
ppp-options {
 chap;
 pap;
}
vlan-id number;
vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
}
}
interfaces {
 demux0 {...}
}
interfaces {
 pp0 {...}
}
}
protocols {
 igmp {
 interface interface-name {
 accounting;
 disable;
 group-policy;
 immediate-leave
 no-accounting;
 promiscuous-mode;
 ssm-map ssm-map-name;
 static {
 group group {
 source source;
 }
 }
 version version;
 }
 }
 mld {
 interface interface-name {
 disable;
 (accounting | no-accounting);
 group-policy;
 immediate-leave;
 oif-map;
 passive;
 ssm-map ssm-map-name;
 static {
 group multicast-group-address {
 exclude;
 group-count number;
 }
 }
 }
 }
}
```

```

 group-increment increment;
 source ip-address {
 source-count number;
 source-increment increment;
 }
 }
}
version version;
}
}
router-advertisement {
 interface interface-name {
 current-hop-limit number;
 default-lifetime seconds;
 (managed-configuration | no-managed-configuration);
 max-advertisement-interval seconds;
 min-advertisement-interval seconds;
 (other-stateful-configuration | no-other-stateful-configuration);
 prefix prefix;
 reachable-time milliseconds;
 retransmit-timer milliseconds;
 }
}
}
}
routing-instances routing-instance-name {
 interface interface-name;
 routing-options {
 access {
 route prefix {
 next-hop next-hop;
 metric route-cost;
 preference route-distance;
 tag route-tag;
 }
 }
 access-internal {
 route subscriber-ip-address {
 qualified-next-hop underlying-interface {
 mac-address address;
 }
 }
 }
 multicast {
 interface interface-name {
 no-qos-adjust;
 }
 }
 }
}
rib routing-table-name {
 access {
 route prefix {
 next-hop next-hop;
 metric route-cost;
 preference route-distance;
 tag route-tag;
 }
 }
}

```

```

 }
 }
 access-internal {
 route subscriber-ip-address {
 qualified-next-hop underlying-interface {
 mac-address address;
 }
 }
 }
}
routing-options {
 access {
 route prefix {
 next-hop next-hop;
 metric route-cost;
 preference route-distance;
 tag route-tag;
 }
 }
 access-internal {
 route subscriber-ip-address {
 qualified-next-hop underlying-interface {
 mac-address address;
 }
 }
 }
 multicast {
 interface interface-name {
 no-qos-adjust;
 }
 }
}
variables {
 variable-name {
 default-value default-value;
 equals expression;
 mandatory;
 uid;
 uid-reference;
 }
}
}

```

Hierarchy Level [\[edit\]](#)

**Release Information** Statement introduced in Junos OS Release 9.2.  
Support at the **filter**, **policer**, **hierarchical-policer**, **three-color-policer**, and **policy options** hierarchy levels introduced in Junos OS Release 11.4.

**Description** Create dynamic profiles for use with DHCP or PPP client access.

**Options** *profile-name*—Name of the dynamic profile; string of up to 80 alphanumeric characters.

The remaining statements are explained separately.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring a Basic Dynamic Profile*
- *Configuring Dynamic VLANs Based on Agent Circuit Identifier Information*
- *Dynamic Profiles Overview*

## e1-options

**Syntax**

```
e1-options {
 bert-algorithm algorithm;
 bert-error-rate rate;
 bert-period seconds;
 fcs (16 | 32);
 framing (g704 | g704-no-crc4 | unframed);
 idle-cycle-flag (flags | ones);
 invert-data;
 loopback (local | remote);
 start-end-flag (filler | shared);
 timeslots time-slot-range;
}
```

**Hierarchy Level** [edit interfaces *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description** Configure E1-specific physical interface properties.  
  
The statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Channelized E1 IQ and IQE Interfaces Overview*
- *Channelized STM1 Interfaces Overview*
- *E1 Interfaces Overview*
- *T1 Interfaces Overview*

## e3-options

---

**Syntax**    e3-options {  
              `atm-encapsulation` (direct | plcp);  
              `bert-algorithm` *algorithm*;  
              `bert-error-rate` *rate*;  
              `bert-period` *seconds*;  
              `buildout` *feet*;  
              `compatibility-mode` (digital-link | kentrox | larscom) <subrate *value*>;  
              `fcs` (16 | 32);  
              `framing` (g.751 | g.832);  
              `idle-cycle-flag` *value*;  
              `invert-data`;  
              `loopback` (local | remote);  
              (payload-scrambler | no-payload-scrambler);  
              `start-end-flag` *value*;  
              (unframed | no-unframed);  
              }

**Hierarchy Level**    [edit interfaces *interface-name*]

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure E3-specific physical interface properties.

For ATM1 interfaces, you can configure a subset of E3 options statements.

The statements are explained separately.

**Required Privilege Level**    interface—To view this statement in the configuration.  
                                  interface-control—To add this statement to the configuration.

**Related Documentation**

- *E3 Interfaces Overview*
- *T3 Interfaces Overview*
- [atm-options on page 416](#)



## east-interface

**Syntax**

```
east-interface {
 node-id mac-address;
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 interface-none
 ring-protection-link-end;
}
```

**Hierarchy Level** [edit protocols [protection-group ethernet-ring ring-name](#)]

**Release Information** Statement introduced in Junos OS Release 9.4.  
Statement introduced in Junos OS Release 12.1 for EX Series switches.  
Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.

**Description** Define one of the two interface ports for Ethernet ring protection, the other being defined by the **west-interface** statement at the same hierarchy level. The interface must use the control channel's logical interface name. The control channel is a dedicated VLAN channel for the ring port.

EX Series switches do not use the node-id statement--the node ID is automatically configured on the switches using the MAC address.



**NOTE:** Always configure this port first, before configuring the **west-interface** statement.



**NOTE:** The Node ID is not configurable on EX Series switches. The node ID is automatically configured using the MAC address.

The statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**


- *Ethernet Ring Protection Switching Overview*
- *Ethernet Ring Protection Using Ring Instances for Load Balancing*
- [west-interface on page 953](#)
- [ethernet-ring on page 537](#)
- *Example: Configuring Ethernet Ring Protection Switching on EX Series Switches*

- *Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS*
- *Configuring Ethernet Ring Protection Switching (CLI Procedure)*

---

## egress-policer-overhead

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>egress-policer-overhead bytes;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <code>[edit chassis fpc slot-number pic pic-number]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Add the specified number of bytes to the actual length of an Ethernet frame when determining the actions of Layer 2 policers, MAC policers, or queue rate limits applied to output traffic on the line card. You can configure egress policer overhead to account for egress <i>shaping</i> overhead bytes added to output traffic on the line card.</p> <p>On M Series and T Series routers, this statement is supported on Gigabit Ethernet Intelligent Queuing 2 (IQ2) PICs and Enhanced IQ2 (IQ2E) PICs. On MX Series routers, this statement is supported for interfaces configured on Dense Port Concentrators (DPCs).</p> |
|                                 | <div><b>NOTE:</b> This statement is not supported on Modular Interface Cards (MICs) or Modular Port Concentrators (MPCs) in MX Series routers.</div>                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>bytes</b>—Number of bytes added to a packet exiting an interface.</p> <p><b>Range:</b> 0–255 bytes</p> <p><b>Default:</b> 0</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>egress-shaping-overhead</i></li><li>• <i>Policer Overhead to Account for Rate Shaping Overview</i></li><li>• <i>Example: Configuring Policer Overhead to Account for Rate Shaping</i></li><li>• <i>Configuring a Policer Overhead</i></li><li>• <i>CoS on Enhanced IQ2 PICs Overview</i></li></ul>                                                                                                                                                                                                                                                                                       |

## encapsulation (Container Interface)

---

|                                 |                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>encapsulation (cisco-hdlc   ppp);</code>                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>cin</i> ]                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                       |
| <b>Description</b>              | Container link-layer encapsulation type.                                                                                                                                                            |
| <b>Options</b>                  | <b>cisco-hdlc</b> —Use Cisco-compatible High-Level Data Link Control (HDLC) framing.<br><b>ppp</b> —Use serial PPP encapsulation.                                                                   |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li></ul> |

## encapsulation (Logical Interface)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | encapsulation (atm-ccc-cell-relay   atm-ccc-vc-mux   atm-cisco-nlpid   atm-mlppp-llc   atm-nlpid   atm-ppp-llc   atm-ppp-vc-mux   atm-snap   atm-tcc-snap   atm-tcc-vc-mux   atm-vc-mux   ether-over-atm-llc   ether-vpls-over-atm-llc   ether-vpls-over-fr   ether-vpls-over-ppp   ethernet   ethernet-ccc   ethernet-vpls   ethernet-vpls-fr   frame-relay-ccc   frame-relay-ether-type   frame-relay-ether-type-tcc   frame-relay-ppp   frame-relay-tcc   gre-fragmentation   multilink-frame-relay-end-to-end   multilink-ppp   ppp-over-ether   ppp-over-ether-over-atm-llc   vlan-bridge   vlan-ccc   vlan-vci-ccc   vlan-tcc   vlan-vpls   vxlan);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces <i>rlsq number</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers ( <b>ethernet</b> , <b>vlan-ccc</b> , and <b>vlan-tcc</b> options only).<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. Only the <b>atm-ccc-cell-relay</b> and <b>atm-ccc-vc-mux</b> options are supported on ACX Series routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>         | Configure a logical link-layer encapsulation type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>             | <p><b>atm-ccc-cell-relay</b>—Use ATM cell-relay encapsulation.</p> <p><b>atm-ccc-vc-mux</b>—Use ATM virtual circuit (VC) multiplex encapsulation on CCC circuits. When you use this encapsulation type, you can configure the <b>ccc</b> family only.</p> <p><b>atm-cisco-nlpid</b>—Use Cisco ATM network layer protocol identifier (NLPID) encapsulation. When you use this encapsulation type, you can configure the <b>inet</b> family only.</p> <p><b>atm-mlppp-llc</b>—For ATM2 IQ interfaces only, use Multilink Point-to-Point (MLPPP) over AAL5 LLC. For this encapsulation type, your router must be equipped with a Link Services or Voice Services PIC. MLPPP over ATM encapsulation is not supported on ATM2 IQ OC48 interfaces.</p> <p><b>atm-nlpid</b>—Use ATM NLPID encapsulation. When you use this encapsulation type, you can configure the <b>inet</b> family only.</p> <p><b>atm-ppp-llc</b>—(ATM2 IQ interfaces and MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP only) Use PPP over AAL5 LLC encapsulation.</p> <p><b>atm-ppp-vc-mux</b>—(ATM2 IQ interfaces and MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP only) Use PPP over ATM AAL5 multiplex encapsulation.</p> <p><b>atm-snap</b>—(All interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) Use ATM subnetwork attachment point (SNAP) encapsulation.</p> <p><b>atm-tcc-snap</b>—Use ATM SNAP encapsulation on translational cross-connect (TCC) circuits.</p> |

**atm-tcc-vc-mux**—Use ATM VC multiplex encapsulation on TCC circuits. When you use this encapsulation type, you can configure the **tcc** family only.

**atm-vc-mux**—(All interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) Use ATM VC multiplex encapsulation. When you use this encapsulation type, you can configure the **inet** family only.

**ether-over-atm-llc**—(All IP interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) For interfaces that carry IP traffic, use Ethernet over ATM LLC encapsulation. When you use this encapsulation type, you cannot configure multipoint interfaces.

**ether-vpls-over-atm-llc**—For ATM2 IQ interfaces only, use the Ethernet virtual private LAN service (VPLS) over ATM LLC encapsulation to bridge Ethernet interfaces and ATM interfaces over a VPLS routing instance (as described in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*). Packets from the ATM interfaces are converted to standard ENET2/802.3 encapsulated Ethernet frames with the frame check sequence (FCS) field removed.

**ether-vpls-over-fr**—For E1, T1, E3, T3, and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over Frame Relay encapsulation to support Bridged Ethernet over Frame Relay encapsulated TDM interfaces for VPLS applications, per RFC 2427, *Multiprotocol Interconnect over Frame Relay*.



**NOTE:** The SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, the Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, and the DS3/E3 MIC do not support Ethernet over Frame Relay encapsulation.

**ether-vpls-over-ppp**—For E1, T1, E3, T3, and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over Point-to-Point Protocol (PPP) encapsulation to support Bridged Ethernet over PPP-encapsulated TDM interfaces for VPLS applications.

**ethernet**—Use Ethernet II encapsulation (as described in RFC 894, *A Standard for the Transmission of IP Datagrams over Ethernet Networks*).

**ethernet-ccc**—Use Ethernet CCC encapsulation on Ethernet interfaces.

**ethernet-vpls**—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard Tag Protocol ID (TPID) values.



**NOTE:** The built-in Gigabit Ethernet PIC on an M7i router does not support extended VLAN VPLS encapsulation.

**ethernet-vpls-fr**—Use in a VPLS setup when a CE device is connected to a PE device over a time-division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer layer 2 Frame Relay connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use the MAC address to forward the packet into a given VPLS instance.

**frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**frame-relay-ether-type**—Use Frame Relay ether type encapsulation for compatibility with Cisco Frame Relay. The physical interface must be configured with flexible-frame-relay encapsulation.

**frame-relay-ether-type-tcc**—Use Frame Relay ether type TCC for Cisco-compatible Frame Relay on TCC circuits to connect different media. The physical interface must be configured with flexible-frame-relay encapsulation.

**frame-relay-ppp**—Use PPP over Frame Relay circuits. When you use this encapsulation type, you can configure the **ppp** family only.

**frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits for connecting different media. When you use this encapsulation type, you can configure the **tcc** family only.

**gre-fragmentation**—For adaptive services interfaces only, use GRE fragmentation encapsulation to enable fragmentation of IPv4 packets in GRE tunnels. This encapsulation clears the do not fragment (DF) bit in the packet header. If the packet's size exceeds the tunnel's maximum transmission unit (MTU) value, the packet is fragmented before encapsulation.

**multilink-frame-relay-end-to-end**—Use MLFR FRF.15 encapsulation. This encapsulation is used only on multilink, link services, and voice services interfaces and their constituent T1 or E1 interfaces, and is supported on LSQ and redundant LSQ interfaces.

**multilink-ppp**—Use MLPPP encapsulation. This encapsulation is used only on multilink, link services, and voice services interfaces and their constituent T1 or E1 interfaces.

**ppp-over-ether**—You use PPP over Ethernet encapsulation to configure an underlying Ethernet interface for a dynamic PPPoE logical interface.

**ppp-over-ether-over-atm-llc**—(MX Series routers with MPCs using the ATM MIC with SFP only) For underlying ATM interfaces, use PPP over Ethernet over ATM LLC encapsulation. When you use this encapsulation type, you cannot configure the interface address. Instead, configure the interface address on the PPP interface.

**vlan-bridge**—Use Ethernet VLAN bridge encapsulation on Ethernet interfaces that have IEEE 802.1Q tagging, flexible-ethernet-services, and bridging enabled and that must accept packets carrying TPID 0x8100 or a user-defined TPID.

**vlan-ccc**—Use Ethernet virtual LAN (VLAN) encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**vlan-vci-ccc**—Use ATM-to-Ethernet interworking encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**vlan-tcc**—Use Ethernet VLAN encapsulation on TCC circuits. When you use this encapsulation type, you can configure the **tcc** family only.

**vlan-vpls**—Use Ethernet VLAN encapsulation on VPLS circuits.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Layer 2 Switching Cross-Connects Using CCC*
- *Configuring the Encapsulation for Layer 2 Switching TCCs*
- [Configuring Interface Encapsulation on Logical Interfaces on page 170](#)
- *Configuring MPLS LSP Tunnel Cross-Connects Using CCC*
- [Circuit and Translational Cross-Connects Overview on page 247](#)
- *Identifying the Access Concentrator*
- *Configuring ATM Interface Encapsulation*
- *Configuring VLAN and Extended VLAN Encapsulation*
- [Configuring ATM-to-Ethernet Interworking on page 254](#)
- [Configuring Interface Encapsulation on PTX Series Packet Transport Routers on page 120](#)
- *Configuring CCC Encapsulation for Layer 2 VPNs*
- *Configuring TCC Encapsulation for Layer 2 VPNs and Layer 2 Circuits*
- *Configuring ATM for Subscriber Access*
- *CoS on ATM IMA Pseudowire Interfaces Overview*
- *Configuring Policing on an ATM IMA Pseudowire*

## encapsulation (Physical Interface)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>encapsulation (atm-ccc-cell-relay   atm-pvc   cisco-hdlc   cisco-hdlc-ccc   cisco-hdlc-tcc   ethernet-bridge   ethernet-ccc   ethernet-over-atm   ethernet-tcc   ethernet-vpls   ethernet-vpls-fr   ether-vpls-over-atm-llc   ethernet-vpls-ppp   extended-frame-relay-ccc   extended-frame-relay-ether-type-tcc   extended-frame-relay-tcc   extended-vlan-bridge   extended-vlan-ccc   extended-vlan-tcc   extended-vlan-vpls   flexible-ethernet-services   flexible-frame-relay   frame-relay   frame-relay-ccc   frame-relay-ether-type   frame-relay-ether-type-tcc   frame-relay-port-ccc   frame-relay-tcc   generic-services   multilink-frame-relay-uni-nni   ppp   ppp-ccc   ppp-tcc   vlan-ccc   vlan-vci-ccc   vlan-vpls);</code>                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces rlsq <i>number:number</i>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers ( <b>flexible-ethernet-services</b> , <b>ethernet-ccc</b> , and <b>ethernet-tcc</b> options only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>         | Specify the physical link-layer encapsulation type. Not all encapsulation types are supported on the switches. See the switch CLI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>             | For SONET interfaces— <b>ppp</b><br><br>For ATM interfaces— <b>atm-pvc</b><br><br>For DS1, E1, and T1 interfaces— <b>ppp</b><br><br>For DS3, E3, and T3 interfaces— <b>ppp</b><br><br>For all channelized interfaces— <b>ppp</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>             | <b>atm-ccc-cell-relay</b> —Use ATM cell-relay encapsulation.<br><br><b>atm-pvc</b> —Use ATM PVC encapsulation.<br><br><b>cisco-hdlc</b> —Use Cisco-compatible High-Level Data Link Control (HDLC) framing.<br><br><b>cisco-hdlc-ccc</b> —Use Cisco-compatible HDLC framing on CCC circuits.<br><br><b>cisco-hdlc-tcc</b> —Use Cisco-compatible HDLC framing on TCC circuits for connecting different media.<br><br><b>ethernet-bridge</b> —Use Ethernet bridge encapsulation on Ethernet interfaces that have bridging enabled and that must accept all packets.<br><br><b>ethernet-ccc</b> —Use Ethernet CCC encapsulation on Ethernet interfaces that must accept packets carrying standard Tag Protocol ID (TPID) values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, CCC is not supported.<br><br><b>ethernet-over-atm</b> —For interfaces that carry IPv4 traffic, use Ethernet over ATM encapsulation. When you use this encapsulation type, you cannot configure multipoint |



interfaces. As defined in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*, this encapsulation type allows ATM interfaces to connect to devices that support only bridge protocol data units (BPDUs). Junos OS does not completely support bridging, but accepts BPDU packets as a default gateway. If you use the router as an edge device, then the router acts as a default gateway. It accepts Ethernet LLC/SNAP frames with IP or ARP in the payload, and drops the rest. For packets destined to the Ethernet LAN, a route lookup is done using the destination IP address. If the route lookup yields a full address match, the packet is encapsulated with an LLC/SNAP and MAC header, and the packet is forwarded to the ATM interface.

**ethernet-tcc**—For interfaces that carry IPv4 traffic, use Ethernet TCC encapsulation on interfaces that must accept packets carrying standard TPID values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, TCC is not supported.

**ethernet-vpls**—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard TPID values. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.

**ethernet-vpls-fr**—Use in a VPLS setup when a CE device is connected to a PE device over a time division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer Layer 2 Frame Relay connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use the MAC address to forward the packet into a given VPLS instance.

**ethernet-vpls-ppp**—Use in a VPLS setup when a CE device is connected to a PE device over a time division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer Layer 2 PPP connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use it to forward the packet into a given VPLS instance.

**ether-vpls-over-atm-llc**—For ATM intelligent queuing (IQ) interfaces only, use the Ethernet virtual private LAN service (VPLS) over ATM LLC encapsulation to bridge Ethernet interfaces and ATM interfaces over a VPLS routing instance (as described in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*). Packets from the ATM interfaces are converted to standard ENET2/802.3 encapsulated Ethernet frames with the frame check sequence (FCS) field removed.

**extended-frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits. This encapsulation type allows you to dedicate DLCIs 1 through 1022 to CCC.

**extended-frame-relay-ether-type-tcc**—Use extended Frame Relay ether type TCC for Cisco-compatible Frame Relay for DLCIs 1 through 1022. This encapsulation type is used for circuits with different media on either side of the connection.

**extended-frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits to connect different media. This encapsulation type allows you to dedicate DLCIs 1 through 1022 to TCC.

**extended-vlan-bridge**—Use extended VLAN bridge encapsulation on Ethernet interfaces that have IEEE 802.1Q VLAN tagging and bridging enabled and that must accept packets carrying TPID 0x8100 or a user-defined TPID.

**extended-vlan-ccc**—Use extended VLAN encapsulation on CCC circuits with Gigabit Ethernet and 4-port Fast Ethernet interfaces that must accept packets carrying 802.1Q values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, extended VLAN CCC is not supported. For 4-port Gigabit Ethernet PICs, extended VLAN CCC is not supported.

**extended-vlan-tcc**—For interfaces that carry IPv4 traffic, use extended VLAN encapsulation on TCC circuits with Gigabit Ethernet interfaces on which you want to use 802.1Q tagging. For 4-port Gigabit Ethernet PICs, extended VLAN TCC is not supported.

**extended-vlan-vpls**—Use extended VLAN VPLS encapsulation on Ethernet interfaces that have VLAN 802.1Q tagging and VPLS enabled and that must accept packets carrying TPIDs 0x8100, 0x9100, and 0x9901. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.



**NOTE:** The built-in Gigabit Ethernet PIC on an M7i router does not support extended VLAN VPLS encapsulation.

---

**flexible-ethernet-services**—For Gigabit Ethernet IQ interfaces and Gigabit Ethernet PICs with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), use flexible Ethernet services encapsulation when you want to configure multiple per-unit Ethernet encapsulations. Aggregated Ethernet bundles can use this encapsulation type. This encapsulation type allows you to configure any combination of route, TCC, CCC, Layer 2 virtual private networks (VPNs), and VPLS encapsulations on a single physical port. If you configure flexible Ethernet services encapsulation on the physical interface, VLAN IDs from 1 through 511 are no longer reserved for normal VLANs.

**flexible-frame-relay**—For IQ interfaces only, use flexible Frame Relay encapsulation when you want to configure multiple per-unit Frame Relay encapsulations. This encapsulation type allows you to configure any combination of TCC, CCC, and standard Frame Relay encapsulations on a single physical port. Also, each logical interface can have any DLCI value from 1 through 1022.

**frame-relay**—Use Frame Relay encapsulation.

**frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits.

**frame-relay-ether-type**—Use Frame Relay ether type encapsulation for compatibility with the Cisco Frame Relay.

**frame-relay-ether-type-tcc**—Use Frame Relay ether type TCC for Cisco-compatible Frame Relay on TCC circuits to connect different media.

**frame-relay-port-ccc**—Use Frame Relay port CCC encapsulation to transparently carry all the DLCIs between two customer edge (CE) routers without explicitly configuring each DLCI on the two provider edge (PE) routers with Frame Relay transport. When you use this encapsulation type, you can configure the **ccc** family only.

**frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits to connect different media.

**generic-services**—Use generic services encapsulation for services with a hierarchical scheduler.

**multilink-frame-relay-uni-nni**—Use MLFR UNI NNI encapsulation. This encapsulation is used on link services, voice services interfaces functioning as FRF.16 bundles, and their constituent T1 or E1 interfaces, and is supported on LSQ and redundant LSQ interfaces.

**ppp**—Use serial PPP encapsulation.

**ppp-ccc**—Use serial PPP encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**ppp-tcc**—Use serial PPP encapsulation on TCC circuits for connecting different media. When you use this encapsulation type, you can configure the **tcc** family only.

**vlan-ccc**—Use Ethernet VLAN encapsulation on CCC circuits.

**vlan-vci-ccc**—Use ATM-to-Ethernet interworking encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only. All logical interfaces configured on the Ethernet interface must also have the encapsulation type set to **vlan-vci-ccc**.

**vlan-vpls**—Use VLAN VPLS encapsulation on Ethernet interfaces with VLAN tagging and VPLS enabled. Interfaces with VLAN VPLS encapsulation accept packets carrying standard TPID values only. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.



#### NOTE:

- Label-switched interfaces (LSIs) do not support VLAN VPLS encapsulation. Therefore, you can only use VLAN VPLS encapsulation on a PE-router-to-CE-router interface and not a core-facing interface.
- Starting with Junos OS release 13.3, a commit error occurs when you configure **vlan-vpls** encapsulation on a physical interface and configure family **inet** on one of the logical units. Previously, it was possible to commit this invalid configuration.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

- Related Documentation**
- [Configuring Interface Encapsulation on Physical Interfaces on page 117](#)
  - *Configuring CCC Encapsulation for Layer 2 VPNs*
  - *Configuring Layer 2 Switching Cross-Connects Using CCC*
  - *Configuring TCC Encapsulation for Layer 2 VPNs and Layer 2 Circuits*
  - *Configuring ATM Interface Encapsulation*
  - [Configuring ATM-to-Ethernet Interworking on page 254](#)
  - *Configuring VLAN and Extended VLAN Encapsulation*
  - *OBSOLETE: Configuring Extended VLAN Encapsulation*
  - *Configuring Encapsulation for Layer 2 Wholesale VLAN Interfaces*
  - *Configuring Interfaces for Layer 2 Circuits*
  - [Configuring Interface Encapsulation on PTX Series Packet Transport Routers on page 120](#)
  - *Configuring MPLS LSP Tunnel Cross-Connects Using CCC*
  - *Configuring TCC*
  - *Configuring VPLS Interface Encapsulation*
  - *Configuring Interfaces for VPLS Routing*
  - [Defining the Encapsulation for Switching Cross-Connects on page 249](#)

---

## encoding

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | encoding (nrz   nrzi);                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | For serial interfaces, set the line encoding format.                                                                    |
| <b>Default</b>                  | The default line encoding is non-return to zero (NRZ).                                                                  |
| <b>Options</b>                  | <b>nrz</b> —Use NRZ line encoding.<br><b>nrzi</b> —Use non-return to zero inverted (NRZI) line encoding.                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | • <a href="#">Configuring Serial Line Encoding on page 308</a>                                                          |

## epd-threshold (Logical Interface)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>epd-threshold cells <b>plp1</b> cells;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> <b>family</b> <i>family</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>For ATM2 IQ interfaces only, define the early packet discard (EPD) threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded. For interfaces configured in trunk mode, you can also configure dual EPD thresholds depending on the packet loss priorities (PLPs).</p>                                                                                                                                                                                                                                |
| <b>Default</b>                  | <p>Approximately 1 percent of the available cell buffers. If shaping is enabled, the default EPD threshold is proportional to the shaping rate according to the following formula:</p> $\text{default epd-threshold} = \text{number of buffers} * \text{shaping rate} / \text{line rate}$ <p>The minimum EPD threshold value is 48 cells. If the default EPD threshold formula results in an EPD threshold of less than 48 cells, the result will be ignored, and the minimum value of 48 cells will be used.</p>                                                                               |
| <b>Options</b>                  | <p><b>cells</b>—Maximum number of cells.</p> <p><b>Range:</b> For 1-port and 2-port OC12 interfaces, 48 through 425,984 cells</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the ATM2 IQ EPD Threshold</i></li> <li>• <i>Configuring Two EPD Thresholds per Queue</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## epd-threshold (Physical Interface)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>epd-threshold cells <b>plp1</b> cells;</code>                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the EPD threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded.                                                                                                                                                                         |
| <b>Default</b>                  | If you do not include either the <b>epd-threshold</b> or the <b>linear-red-profile</b> statement in the forwarding class configuration, the Junos OS uses an EPD threshold based on the available bandwidth and other parameters.                                                                                                                                      |
| <b>Options</b>                  | <b>cells</b> —Maximum number of cells.<br><b>Range:</b> For 1-port and 2-port OC12 interfaces, 48 through 425,984 cells. For 1-port OC48 interfaces, 48 through 425,984 cells. For 2-port OC3, DS3, and E3 interfaces, 48 through 212,992 cells. For 4-port DS3 and E3 interfaces, 48 through 106,496 cells.<br><br>The <b>plp1</b> statement is explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ATM Scheduler Map</i></li><li>• <a href="#">linear-red-profile on page 636</a></li></ul>                                                                                                                                                                                                                     |

## es-options

---

|                                 |                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>es-options {<br/>    <b>backup-interface</b> <i>interface-name</i>;<br/>}</pre>                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces es- <i>fpc/pic/port</i> ]                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                             |
| <b>Description</b>              | On ES interfaces, configure ES interface-specific interface properties.<br><br>The <b>backup-interface</b> statement is explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                             |

## ethernet (Protocols OAM)

```
Syntax ethernet {
 connectivity-fault-management {
 action-profile profile-name {
 default-actions {
 interface-down;
 }
 }
 }
 performance-monitoring {
 delegate-server-processing;
 hardware-assisted-timestamping;
 sla-iterator-profiles {
 profile-name {
 avg-fd-twoway-threshold;
 avg-ifdv-twoway-threshold;
 avg-flr-forward-threshold;
 avg-flr-backward-threshold;
 disable;
 calculation-weight {
 delay delay-weight;
 delay-variation delay-variation-weight;
 }
 cycle-time milliseconds;
 iteration-period connections;
 measurement-type (loss | statistical-frame-loss | two-way-delay);
 }
 }
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {
 level number;
 name-format (character-string | none | dns | mac+2octet);
 maintenance-association ma-name {
 short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
 protect-maintenance-association protect-ma-name;
 remote-maintenance-association remote-ma-name;
 continuity-check {
 convey-loss-threshold;
 hold-interval minutes;
 interface-status-tlv;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number;
 port-status-tlv;
 }
 mep mep-id {
 auto-discovery;
 direction (up | down);
 interface interface-name (protect | working);
 lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
 rem-err-xcon | xcon);
 }
 }
 }
}
```

Copyright © 2016, Juniper Networks, Inc.



```
lmi {
 status-counter count;
 polling-verification-timer value;
 interface name {
 uni-id uni-name;
 status-counter number;
 polling-verification-timer value;
 evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
 evc evc-name {
 default-evc;
 vlan-list vlan-id-list;
 }
 }
}
```

**Hierarchy Level** [edit protocols [oam](#)]

**Release Information** Statement introduced in Junos OS Release 8.2.

**Description** For Ethernet interfaces on EX Series switches, and M320, MX Series, and T Series routers, provide fault signaling and detection for 802.3ah Operation, Administration, and Management (OAM) support.


The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Enabling IEEE 802.3ah OAM Support*

## ethernet-policer-profile

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre> ethernet-policer-profile {   input-priority-map {     ieee802.1p premium [ values ];   }   output-priority-map {     classifier {       premium {         forwarding-class class-name {           loss-priority (high   low);         }       }     }   }   policer cos-policer-name {     aggregate {       bandwidth-limit bps;       burst-size-limit bytes;     }     premium {       bandwidth-limit bps;       burst-size-limit bytes;     }   } } </pre>                                                                                                                                                                                                                                                                                                                                                                  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> ],<br>[edit interfaces <i>interface-name</i> aggregated-ether-options <a href="#">ethernet-switch-profile</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Release Information      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description              | <p> <b>NOTE:</b> On QFX Series standalone switches, this statement hierarchy is only supported on the Enhanced Layer 2 Switching CLI.</p> <p>For Gigabit Ethernet IQ, 10-Gigabit Ethernet, Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, configure a class of service (CoS)-based policer. Policing applies to the inner VLAN identifiers, not to the outer tag. For Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), the <b>premium</b> policer is not supported.</p> <p>The statements are explained separately.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Related Documentation    | <ul style="list-style-type: none"> <li><i>Configuring Gigabit Ethernet Policers</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## ethernet-ring

**Syntax** ethernet-ring *ring-name* {  
     control-vlan (*vlan-id* | *vlan-name*);  
     data-channel {  
         vlan *number*  
     }  
     east-interface {  
         control-channel *channel-name* {  
             vlan *number*;  
             interface name *interface-name*  
         }  
     }  
     guard-interval *number*;  
     node-id *mac-address*;  
     restore-interval *number*;  
     ring-protection-link-owner;  
     west-interface {  
         control-channel *channel-name* {  
             vlan *number*;  
         }  
     }  
 }

**Hierarchy Level** [edit protocols [protection-group](#)]

**Release Information** Statement introduced in Junos OS Release 9.4.  
 Statement introduced in Junos OS Release 12.1 for EX Series switches.  
 Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.

**Description** For Ethernet PICs on MX Series routers or for EX Series switches, , specify the Ethernet ring in an Ethernet ring protection switching configuration.

**Options** *ring-name*—Name of the Ethernet protection ring.  
 The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- *Ethernet Ring Protection Switching Overview*
- *Example: Configuring Ethernet Ring Protection Switching on EX Series Switches*
- *Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS*
- *Configuring Ethernet Ring Protection Switching (CLI Procedure)*

## ethernet-switch-profile

**Syntax**

```
ethernet-switch-profile {
 ethernet-policer-profile {
 input-priority-map {
 ieee802.1p premium [values];
 }
 output-priority-map {
 classifier {
 premium {
 forwarding-class class-name {
 loss-priority (high | low);
 }
 }
 }
 }
 }
 policer cos-policer-name {
 aggregate {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 premium {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 }
 tag-protocol-id tpid;
}
mac-learn-enable;
```

**Hierarchy Level** [edit interfaces *interface-name* *gigether-options*],  
[edit interfaces *interface-name* *aggregated-ether-options*],  
[edit interfaces *interface-name* *aggregated-ether-options*],  
[edit interfaces *interface-name* *ether-options*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  
Statement introduced in Junos OS Release 13.2 for the QFX Series.  
Statement introduced in Junos OS Release 13.2X50-D15 for the EX Series switches.

**Description**



**NOTE:** On QFX Series standalone switches, the `ethernet-policer-profile` CLI hierarchy and the `mac-learn-enable` statement are supported only on the Enhanced Layer 2 Switching CLI.

For Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC, aggregated Ethernet with Gigabit Ethernet IQ interfaces, the built-in Gigabit Ethernet port on the M7i router); 100-Gigabit Ethernet Type 5 PIC with CFP; and Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit

Ethernet, and aggregated Ethernet interfaces on EX Series switches, configure VLAN tag and MAC address accounting and filtering properties.

The remaining statements are explained separately.



**NOTE:** When you gather interfaces into a bridge domain, the `no-mac-learn-enable` statement at the [edit interfaces *interface-name* *gather-options* ethernet-switch-profile] hierarchy level is not supported. You must use the `no-mac-learning` statement at the [edit bridge-domains *bridge-domain-name* bridge-options interface *interface-name*] hierarchy level to disable MAC learning on an interface in a bridge domain. For information on disabling MAC learning for a bridge domain, see the *MX Series Layer 2 Configuration Guide*.

|                                 |                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | If the <b>ethernet-switch-profile</b> statement is not configured, Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) behave like Gigabit Ethernet interfaces.                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Gigabit Ethernet Policers</i></li> <li>• <i>Configuring MAC Address Filtering</i></li> <li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i></li> <li>• <i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li> </ul> |

## eui-64

|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | eui-64;                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> <b>family</b> inet6 address <i>address</i> ]                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.3 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | For interfaces that carry IP version 6 (IPv6) traffic, automatically generate the host number portion of interface addresses.                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Address on page 187</a></li> </ul>                                                                                                                                                          |

## evcs

---

|                                 |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>evcs evc-id {<br/>    evc-protocol cfm;<br/>    remote-uni-count <i>count</i>;<br/>    multipoint-to-multipoint;<br/>}</pre>                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet</a> ]                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | On MX Series routers with <b>ge</b> , <b>xe</b> , or <b>ae</b> interfaces, configure an OAM Ethernet virtual connection.                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>remote-uni-count <i>count</i></b>—(Optional) Specify the number of remote UNIs in the EVC configuration, the default is 1.</p> <p><b>multipoint-to-multipoint</b>—(Optional) Specify multiple points in the EVC configuration, the default is point-to-point if <b>remote-uni-count</b> is 1.</p> <p>Remaining options are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Ethernet Local Management Interface</i></li><li>• <a href="#">lmi (Ethernet OAM) on page 650</a></li></ul>                                                                                                                                                                                          |

## event (LFM)

|                                 |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>event {   link-adjacency-loss;   link-event-rate {     frame-error count;     frame-period count;     frame-period-summary count;     symbol-period count;   }   protocol-down; }</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> ]                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                |
| <b>Description</b>              | <p>Configure threshold values for link events in an action profile.</p> <p>The remaining statements are explained separately.</p>                                                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Monitoring Protocol Status</i></li> </ul>                                                                                                        |

## event-thresholds

|                                 |                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>event-thresholds {   frame-error count;   frame-period count;   frame-period-summary count;   symbol-period count; }</pre>         |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam link-fault-management interface interface-name</a> ]                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                           |
| <b>Description</b>              | <p>Configure threshold limit values for link events in periodic OAM PDUs.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> </ul>          |

## fast-aps-switch

---

|                            |                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | fast-aps-switch;                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> sonet-options <b>aps</b> ]                                                                                                                        |
| <b>Release Information</b> | Statement introduced in Junos OS Release 12.1.                                                                                                                                           |
| <b>Description</b>         | (M320 routers with Channelized OC3/STM1 Circuit Emulation PIC with SFP only and EX Series switches) Reduce the Automatic Protection Switching (APS) switchover time in Layer 2 circuits. |

**NOTE:**

- Configuring this statement reduces the APS switchover time only when the Layer 2 circuit encapsulation type for the interface receiving traffic from a Layer 2 circuit neighbor is SAToP.
  - When the fast-aps-switch statement is configured in revertive APS mode, you must configure an appropriate value for revert time to achieve reduction in APS switchover time.
  - To prevent the logical interfaces in the data path from being shut down, configure appropriate hold-time values on all the interfaces in the data path that support TDM.
  - The fast-aps-switch statement cannot be configured when the APS annex-b option is configured.
  - The interfaces that have the fast-aps-switch statement configured cannot be used in virtual private LAN service (VPLS) environments.
- 

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Reducing APS Switchover Time in Layer 2 Circuits</i></li></ul>               |



## facility-override

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>facility-override <i>facility-name</i>;</code>                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>services-options</b> <b>sysloghost</b> <i>hostname</i> ]                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Override default facility for system log reporting.                                                                     |
| <b>Options</b>                  | <i>facility-name</i> —Name of facility that overrides the default assignment.                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>     |

## failover-delay

---

|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>failover-delay <i>milliseconds</i>;</code>                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols vrrp]                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                       |
| <b>Description</b>              | Configure the failover delay for VRRP and VRRP for IPv6 operations.                                                 |
| <b>Options</b>                  | <i>milliseconds</i> —Specify the failover delay time, in milliseconds.<br><b>Range:</b> 50 through 2000             |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring VRRP and VRRP for IPv6</i></li> </ul>                       |

## family (Dynamic Standard Interface)

---

**Syntax**    family *family* {  
              access-concentrator *name*;  
              address *address*;  
              direct-connect;  
              duplicate-protection;  
              dynamic-profile *profile-name*;  
              filter {  
                  adf {  
                      counter;  
                      input-precedence *precedence*;  
                      not-mandatory;  
                      output-precedence *precedence*;  
                      rule *rule-value*;  
                  }  
                  input *filter-name* {  
                      precedence *precedence*;  
                      shared-name *filter-shared-name*;  
                  }  
                  output *filter-name* {  
                      precedence *precedence*;  
                      shared-name *filter-shared-name*;  
                  }  
              }  
              mac-validate (loose | strict);  
              max-sessions *number*;  
              max-sessions-vs-a-ignore;  
              rpf-check {  
                  fail-filter *filter-name*;  
                  mode loose;  
              }  
              service {  
                  input {  
                      service-set *service-set-name* {  
                        service-filter *filter-name*;  
                      }  
                      post-service-filter *filter-name*;  
                  }  
                  output {  
                      service-set *service-set-name* {  
                        service-filter *filter-name*;  
                      }  
                  }  
              }  
              service-name-table *table-name*;  
              short-cycle-protection <lockout-time-min *minimum-seconds* lockout-time-max  
                                          *maximum-seconds*>;  
              unnumbered-address *interface-name* <preferred-source-address *address*>;  
          }

**Hierarchy Level**    [edit [dynamic-profiles](#) *profile-name* [interfaces](#) *interface-name* [unit](#) *logical-unit-number*]

**Release Information**    Statement introduced in Junos OS Release 9.2.

**pppoe** option added in Junos OS Release 11.2.

**Description** Configure protocol family information for the logical interface.



**NOTE:** Not all subordinate stanzas are available to every protocol family.

**Options** *family*—Protocol family:

- **inet**—IP version 4 suite
- **inet6**—IP version 6 suite
- **pppoe**—(MX Series routers with MPCs only) Point-to-Point Protocol over Ethernet
- **vpls**—Virtual private LAN service

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Example: Configuring Static Routing on Logical Systems*
- [Configuring the Protocol Family on page 186](#)

## family

```

Syntax family family {
 accounting {
 destination-class-usage;
 source-class-usage {
 (input | output | input output);
 }
 }
 access-concentrator name;
 address address {
 ... the address subhierarchy appears after the main [edit interfaces interface-name unit
 logical-unit-number family family-name] hierarchy ...
 }
 bundle interface-name;
 core-facing;
 demux-destination {
 destination-prefix;
 }
 demux-source {
 source-prefix;
 }
 direct-connect;
 duplicate-protection;
 dynamic-profile profile-name;
 filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
 }
 interface-mode (access | trunk);
 ipsec-sa sa-name;
 keep-address-and-control;
 mac-validate (loose | strict);
 max-sessions number;
 max-sessions-vsa-ignore;
 mtu bytes;
 multicast-only;
 negotiate-address;
 no-redirects;
 policer {
 arp policer-template-name;
 input policer-template-name;
 output policer-template-name;
 }
 primary;
 protocols [inet iso mpls];
 proxy inet-address address;
 receive-options-packets;
 receive-ttl-exceeded;
 remote (inet-address address | mac-address address);
 rpf-check {

```

```

fail-filter filter-name
mode loose;
}
sampling {
input;
output;
}
service {
input {
post-service-filter filter-name;
service-set service-set-name <service-filter filter-name>;
}
output {
service-set service-set-name <service-filter filter-name>;
}
}
service-name-table table-name;
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
maximum-seconds>;
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name destination address destination-profile profile-name;
vlan-id number;
vlan-id-list [number number-number];
address address {
arp ip-address (mac | multicast-mac) mac-address <publish>;
broadcast address;
destination address;
destination-profile name;
eui-64;
master-only;
multipoint-destination address dlci dlci-identifier;
multipoint-destination address {
epd-threshold cells;
inverse-arp;
oam-liveness {
up-count cells;
down-count cells;
}
oam-period (disable | seconds);
shaping {
(cbr rate | rtvbr burst length peak rate sustained rate | vbr burst length peak rate
sustained rate);
queue-length number;
}
vci vpi-identifier.vci-identifier;
}
preferred;
primary;
vrrp-group group-id {
(accept-data | no-accept-data);
advertise-interval seconds;
authentication-key key;
authentication-type authentication;
fast-interval milliseconds;

```

```
(preempt | no-preempt) {
 hold-time seconds;
}
priority number;
track {
 interface interface-name {
 bandwidth-threshold bits-per-second priority-cost priority;
 priority-cost priority;
 }
 priority-hold-time seconds;
 route prefix routing-instance instance-name priority-cost priority;
}
}
virtual-address [addresses];
}
virtual-link-local-address ipv6-address;
}
```

|                     |                                                                                                                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hierarchy Level     | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| Release Information | Statement introduced before Junos OS Release 7.4.<br>Option <b>max-sessions-vs-a-ignore</b> introduced in Junos OS Release 11.4.                                                                               |
| Description         | Configure protocol family information for the logical interface.                                                                                                                                               |



**NOTE:** Not all subordinate stanzas are available to every protocol family.

---

**Options** *family*—Protocol family:

- **any**—Protocol-independent family used for Layer 2 packet filtering



**NOTE:** This option is not supported on T4000 Type 5 FPCs.

- **bridge**—(M Series and T Series routers only) Configure only when the physical interface is configured with **ethernet-bridge** type encapsulation or when the logical interface is configured with **vlan-bridge** type encapsulation
- **ethernet-switching**—(M Series and T Series routers only) Configure only when the physical interface is configured with **ethernet-bridge** type encapsulation or when the logical interface is configured with **vlan-bridge** type encapsulation
- **ccc**—Circuit cross-connect protocol suite
- **inet**—Internet Protocol version 4 suite
- **inet6**—Internet Protocol version 6 suite
- **iso**—International Organization for Standardization Open Systems Interconnection (ISO OSI) protocol suite
- **mlfr-end-to-end**—Multilink Frame Relay FRF.15
- **mlfr-uni-nni**—Multilink Frame Relay FRF.16
- **multilink-ppp**—Multilink Point-to-Point Protocol
- **mpls**—Multiprotocol Label Switching (MPLS)
- **pppoe**—Point-to-Point Protocol over Ethernet
- **tcc**—Translational cross-connect protocol suite
- **tnp**—Trivial Network Protocol
- **vpls**—(M Series and T Series routers only) Virtual private LAN service

The remaining statements are explained separately.

**Required Privilege Level** *interface*—To view this statement in the configuration.  
*interface-control*—To add this statement to the configuration.

**Related Documentation** • [Configuring the Protocol Family on page 186](#)

## fastether-options

---

**Syntax**    fastether-options {  
              802.3ad {  
                  aex (primary | backup);  
                  lACP {  
                      port-priority;  
                  }  
              }  
              (flow-control | no-flow-control);  
              ignore-l3-incompletes;  
              ingress-rate-limit *rate*;  
              (loopback | no-loopback);  
              mpls {  
                  pop-all-labels {  
                      required-depth *number*;  
                  }  
              }  
              source-address-filter {  
                  *mac-address*;  
              }  
              (source-filtering | no-source-filtering);  
          }

**Hierarchy Level**    [edit interfaces *interface-name*]

**Release Information**    Statement introduced before Junos OS Release 7.4.


**Description**    Configure Fast Ethernet-specific interface properties.  
  
                  The statements are explained separately.

**Required Privilege Level**    interface—To view this statement in the configuration.  
                                  interface-control—To add this statement to the configuration.

**Related Documentation**    • *Ethernet Interfaces Overview*



## fcs


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | fcs (16   32);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> e3-options],<br>[edit interfaces <i>interface-name</i> sonet-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> t3-options]                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For E1/E3, SONET/SDH, and T1/T3 interfaces, configure the frame checksum (FCS) on the interface. The checksum must be the same on both ends of the interface.</p> <p>On a channelized OC12 interface, the SONET/SDH <b>fcs</b> statement is not supported. To configure FCS on each DS3 channel, you must include the <b>t3-options fcs</b> statement in the configuration for each channel. For SONET/SDH, the channelized OC12 interface supports DS3 to STS-1 to OC12. For SDH, the channelized OC12 interface supports NxDS3 to NxVC3 to AU3 to STM.</p> |
|                                 | <div>  <p><b>NOTE:</b> When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <b>fcs</b> statement must be included at the [edit interfaces e1-<i>fpc/pic/port</i>] or [edit interfaces t1-<i>fpc/pic/port</i>] hierarchy level as appropriate.</p> </div>                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>16</b>—Use a 16-bit frame checksum on the interface.</p> <p><b>32</b>—Use a 32-bit frame checksum on the interface. Using a 32-bit checksum provides more reliable packet verification, but some older equipment might not support 32-bit checksums.</p> <p><b>Default:</b> 16</p>                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the E1 Frame Checksum</li> <li>Configuring the E3 Frame Checksum</li> <li>Configuring the SONET/SDH Frame Checksum</li> <li>Configuring the T1 Frame Checksum</li> <li>Configuring the T3 Frame Checksum</li> </ul>                                                                                                                                                                                                                                                                                          |

## feac-loop-respond

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (feac-loop-respond   no-feac-loop-respond);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>For T3 interfaces only, configure the router so a remote CSU can place the local router into loopback.</p> <p>If you configure remote or local loopback with the T3 <b>loopback</b> statement, the router does not respond to FEAC requests from the CSU even if you include the <b>feac-loop-respond</b> statement in the configuration. For the router to respond, you must delete the <b>loopback</b> statement from the configuration.</p> <p>You must rollback the setting done on the remote CSU prior to deactivating the <b>feac-loop-respond</b> statement. If the remote CSU cannot comply, clear the remote loop through local configuration to achieve the cleanup. For example, configure remote loopback on the interface and then delete the remote loopback.</p> |
| <b>Default</b>                  | The router does not respond to FEAC requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the T3 FEAC Response</a></li><li>• <a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 658</a></li><li>• <a href="#">remote-loopback-respond on page 811</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## filter

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>filter {   group <i>filter-group-number</i>;   input <i>filter-name</i>;   input-list [ <i>filter-names</i> ];   output <i>filter-name</i>;   output-list [ <i>filter-names</i> ]; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description              | <p> <b>NOTE:</b> On EX Series switches, the <code>group</code>, <code>input-list</code>, <code>output-filter</code> statements are not supported under the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>inet</i>], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>inet6</i>], and [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>mpls</i>] hierarchies.</p> <p>Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure them under the <b>family</b> <code>ethernet-switching</code>, <code>inet</code>, <code>inet6</code>, <code>mpls</code>, or <code>vpls</code> only.</p> |
| Options                  | <p><b>group</b> <i>filter-group-number</i>—Define an interface to be part of a filter group. The default filter group number is 0.</p> <p><b>Range:</b> 0 through 255</p> <p><b>input</b> <i>filter-name</i>—Name of one filter to evaluate when packets are received on the interface.</p> <p><b>output</b> <i>filter-name</i>—Name of one filter to evaluate when packets are transmitted on the interface.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                       |
| Required Privilege Level | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Related Documentation    | <ul style="list-style-type: none"> <li>• <a href="#">Applying a Filter to an Interface on page 212</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Configuring Firewall Filters (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

- *family*

## filter (Applying to an Interface)

---


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>filter {<br/>  input <i>filter-name</i>;<br/>  output <i>filter-name</i>;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ]                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure the family <b>inet</b> , <b>inet6</b> , <b>mpls</b> , or <b>vpls</b> only.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>input <i>filter-name</i></b>—Name of one filter to evaluate when packets are received on the interface.</p> <p><b>output <i>filter-name</i></b>—Name of one filter to evaluate when packets are transmitted on the interface.</p>                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>simple-filter</i></li><li>• <i>Applying Firewall Filter Tricolor Marking Policers to Interfaces</i></li><li>• <i>Example: Classifying Packets Based on Their Destination Address</i></li><li>• <i>Example: Configuring and Verifying a Complex Multifield Filter</i></li><li>• <i>Example: Writing Different DSCP and EXP Values in MPLS-Tagged IP Packets</i></li><li>• <i>Example: Configuring a Simple Filter</i></li><li>• <i>Example: Configuring a Logical Bandwidth Policer</i></li><li>• <i>Configuring Two-Color Policers and Shaping Rate Changes</i></li></ul> |

## flexible-vlan-tagging

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | flexible-vlan-tagging;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces aex],<br>[edit interfaces ge- <i>fpc/pic/port</i> ],<br>[edit interfaces et- <i>fpc/pic/port</i> ],<br>[edit interfaces ps0],<br>[edit interfaces xe- <i>fpc/pic/port</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.1.</p> <p>Support for aggregated Ethernet added in Junos OS Release 9.0.</p> <p>Statement introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.</p> <p>Statement introduced in Junos OS Release 13.2X50-D15 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Support simultaneous transmission of 802.1Q VLAN single-tag and dual-tag frames on logical interfaces on the same Ethernet port, and on pseudowire logical interfaces.</p> <p>This statement is supported on M Series and T Series routers, for Fast Ethernet and Gigabit Ethernet interfaces only on Gigabit Ethernet IQ2 and IQ2-E, IQ, and IQE PICs, and for aggregated Ethernet interfaces with member links in IQ2, IQ2-E, and IQ PICs or in MX Series DPCs, or on Ethernet interfaces for PTX Series Packet Transport Routers or 100-Gigabit Ethernet Type 5 PIC with CFP. This statement is supported on Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces on EX Series switches.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Mixed Tagging</i></li> <li>• <i>Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## flow-control

---

|                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                            | (flow-control   no-flow-control);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                   | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">multiservice-options</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                               | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 in EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                       | For aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, explicitly enable flow control, which regulates the flow of packets from the router or switch to the remote side of the connection. Enabling flow control is useful when the remote device is a Gigabit Ethernet switch. Flow control is not supported on the 4-port Fast Ethernet PIC.                                                                                                                                                                                  |
| <div> <b>NOTE:</b> On the Type 5 FPC, to prioritize control packets in case of ingress oversubscription, you must ensure that the neighboring peers support MAC flow control. If the peers do not support MAC flow control, then you must disable flow control.</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>                                                                                                                                                                                                                                                                                                                                           | Flow control is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                          | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>• <i>Configuring Flow Control</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul>                                                                                                                                                                                                                                                                                                                    |

## flow-control-options

|                            |                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> flow-control-options {   down-on-flow-control;   dump-on-flow-control;   reset-on-flow-control; } </pre>                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>     | [edit interfaces <i>mo-fpc/pic/port</i> multiservice-options]                                                                                                                                                                                                                                                                             |
| <b>Release Information</b> | Statement introduced before Junos OS Release 8.4.                                                                                                                                                                                                                                                                                         |
| <b>Description</b>         | <p>Configure the flow control options for application recovery in case of a prolonged flow control failure.</p> <ul style="list-style-type: none"> <li>• <b>down-on-flow-control</b>—Bring interface down during prolonged flow control.</li> <li>• <b>dump-on-flow-control</b>—Cause core dump during prolonged flow control.</li> </ul> |



**NOTE:** Starting with Junos OS Release 15.1, on MX Series routers with MS-MICs and MS-MPCs, instead of an eJunos kernel core file, the multiservices PIC management daemon (mospmand) core file is generated when a prolonged flow control failure occurs and when you configure the setting to generate a core dump during prolonged flow control (by using the **dump-on-flow-control** option with the **flow-control-options** statement). The watchdog functionality continues to generate a kernel core file in such scenarios.

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <ul style="list-style-type: none"> <li>• <b>reset-on-flow-control</b>—Reset interface during prolonged flow control.</li> </ul>    |
| <b>Usage Guidelines</b>         | See <i>Configuring Flow Monitoring</i> .                                                                                           |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |

## force

---

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>force (protect   working);</code>                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                  |
| <b>Description</b>              | Perform a forced switch between the protect and working circuits. This statement is honored only if there are no higher-priority reasons to switch. It can be overridden by a signal failure on the protect circuit, thus causing a switch to the working circuit. |
| <b>Options</b>                  | <b>protect</b> —Request the circuit to become the protect circuit.<br><b>working</b> —Request the circuit to become the working circuit.                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Switching Between the Working and Protect Circuits</i></li><li>• <a href="#">request on page 813</a></li></ul>                                                                                              |

## forward-and-send-to-re

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>forward-and-send-to-re;</code>                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">targeted-broadcast</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">targeted-broadcast</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Specify that IP packets destined for a Layer 3 broadcast address be forwarded to an egress interface and the Routing Engine. The packets are broadcast only if the egress interface is a LAN interface.                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Targeted Broadcast on page 244</i></li><li>• <a href="#">targeted-broadcast on page 878</a></li><li>• <i>Understanding Targeted Broadcast on page 243</i></li></ul>                                                                                                                                     |



## forwarding-class (ATM2 IQ Scheduler Maps)

|                                 |                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>forwarding-class class-name {     epd-threshold cells plp1 cells;     linear-red-profile profile-name;     priority (high   low);     transmit-weight (cells number   percent number); }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>at-fpc/pic/port</i> atm-options <a href="#">scheduler-maps map-name</a> ]                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define forwarding class name and option values.                                                                                                                        |
| <b>Options</b>                  | <p><b>class-name</b>—Name of forwarding class.</p> <p>The statements are explained separately.</p>                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li> </ul>                                 |

## forwarding-class (Gigabit Ethernet IQ Classifier)

|                                 |                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>forwarding-class class-name {     loss-priority (high   low); }</pre>                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile output-priority-map classifier premium</a> ]                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                    |
| <b>Description</b>              | For Gigabit Ethernet IQ interfaces only, define forwarding class name and option values.                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>class-name</b>—Name of forwarding class.</p> <p>The statements are explained separately.</p>                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Output Priority Map</i></li> <li>• <a href="#">input-priority-map on page 599</a></li> <li>• <b>forwarding-class</b> statement in the <i>Class of Service Feature Guide for Routing Devices</i></li> </ul> |

## forward-only

---

|                                 |                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | forward-only;                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Specify that IP packets destined for a Layer 3 broadcast address be forwarded to an egress interface only. The packets are broadcast only if the egress interface is a LAN interface.                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Targeted Broadcast on page 244</a></li><li>• <a href="#">targeted-broadcast on page 878</a></li><li>• <a href="#">Understanding Targeted Broadcast on page 243</a></li></ul>                                                             |

## fragment-threshold

---

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | fragment-threshold <i>bytes</i> ;                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>mlfr-uni-nni-bundle-options</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                |
| <b>Description</b>              | For multilink, link services, and voice services interfaces, set the fragmentation threshold.                                                                                                                                                                                    |
| <b>Options</b>                  | <b>bytes</b> —Maximum size, in bytes, for multilink packet fragments. Any nonzero value must be a multiple of 64 bytes.<br><b>Range:</b> 128 through 16,320 bytes<br><b>Default:</b> 0 bytes (no fragmentation)                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ISDN Logical Interface Properties</a></li><li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li></ul>                                                                               |

## frame-error

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>frame-error count;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>Threshold for sending frame error events or taking the action specified in the action profile.</p> <p>A frame error is any frame error on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value within the window.</p> <p>The window or period during which frame errors are counted is 5 seconds or multiples of it (with a maximum value of 1 minute). This window denotes the duration as intervals of 100 milliseconds, encoded as a 16-bit unsigned integer. This window is not configurable in Junos OS. According to the IEEE 802.3ah standard, the default value of the frame-errors window is 1 second. This window has a lower bound of 1 second and an upper bound of 1 minute.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame error events.</p> <p><b>Range:</b> 0 through 100</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## frame-period

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>frame-period count;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>Threshold for sending frame period error events or taking the action specified in the action profile.</p> <p>A frame error is any frame error on the underlying physical layer. The frame period threshold is reached when the number of frame errors reaches the configured value within the period window. The default period window is the number of minimum-size frames that can be transmitted on the underlying physical layer in 1 second. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame period error events.</p> <p><b>Range:</b> 0 through 100</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li><li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li></ul>                                                                                                                                                                                                                                                                         |

## frame-period-summary

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>frame-period-summary count;</code>                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Threshold for sending frame period summary error events or taking the action specified in the action profile.</p> <p>An errored frame second is any 1-second period that has at least one errored frame. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period window. The default window is 60 seconds. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame period summary error events.</p> <p><b>Range:</b> 0 through 100</p>                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>                                                                                                                                                                                                          |

## framing (E1, E3, and T1 Interfaces)

|                            |                                                                                                                                                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>framing (g704   g704-no-crc4   g.751   g.832   unframed   sf   esf);</code>                                                                                                                                                                                 |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ce1-fpc/pic/port</i> ],<br>[edit interfaces <i>ct1-fpc/pic/port</i> ],<br>[edit interfaces <i>at-fpc/pic/port</i> e3-options],<br>[edit interfaces <i>e1-fpc/pic/port</i> e1-options],<br>[edit interfaces <i>t1-fpc/pic/port</i> t1-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                   |
| <b>Description</b>         | Configure the framing format.                                                                                                                                                                                                                                     |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `framing` statement must be included at the [edit interfaces *ce1-fpc/pic/port*] or [edit interfaces *ct1-fpc/pic/port*] hierarchy level as appropriate.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | <code>esf</code> for T1 interfaces; <code>g704</code> for E1 interfaces. There is no default value for E3 over ATM interfaces.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><code>esf</code>—Extended superframe (ESF) mode for T1 interfaces.</p> <p><code>g704</code>—G.704 framing format for E1 interfaces.</p> <p><code>g704-no-crc4</code>—G.704 framing with no cyclic redundancy check 4 (CRC4) for E1 interfaces.</p> <p><code>g.751</code>—G.751 framing format for E3 over ATM interfaces.</p> <p><code>g.832</code>—G.832 framing format for E3 over ATM interfaces.</p> <p><code>sf</code>—Superframe (SF) mode for T1 interfaces.</p> <p><code>unframed</code>—Unframed mode for E1 interfaces.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E1 Framing</i></li> <li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li> <li>• <i>Configuring T1 Framing</i></li> </ul>                                                                                                                                                                                                                                                                                                                                          |

## framing (10-Gigabit Ethernet Interfaces)

|                            |                                                                                                                                                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>framing (lan-phy   wan-phy);</code>                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | <code>[edit interfaces xe-fpc/pic/port]</code><br><code>[edit interfaces et-fpc/pic/port]</code> (PTX Series Packet Transport Routers and MX Series Routers)                                                        |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.0.<br>Statement introduced in Junos OS Release 12.3R2 for PTX Series Packet Transport Routers.                                                                           |
| <b>Description</b>         | For routers supporting the 10-Gigabit Ethernet interface, configure the framing format. WAN PHY mode is supported on MX240, MX480, MX960, T640, T1600, T4000, and PTX Series Packet Transport Routers routers only. |



### NOTE:

- The T4000 Core Router supports only LAN PHY mode in Junos OS Release 12.1R1. Starting with Junos OS Release 12.1R2, WAN PHY mode is supported on the T4000 routers with the 12-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-12XGE-SFPP). Starting with Junos OS Release 12.2, WAN PHY mode is supported on the T4000 routers with the 24-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-24XGE-SFPP).
- On PTX Series routers, WAN PHY mode is supported only on the 24-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ .
- When the PHY mode changes, interface traffic is disrupted because of port reinitialization.

|                                 |                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | Operates in LAN PHY mode.                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <b>lan-phy</b> —10GBASE-R interface framing format that bypasses the WIS sublayer to directly stream block-encoded Ethernet frames on a 10-Gigabit Ethernet serial interface.<br><br><b>wan-phy</b> —10GBASE-W interface framing format that allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and SONET devices. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>10-Gigabit Ethernet Framing Overview</i></li> <li>• <i>Configuring SONET Options for 10-Gigabit Ethernet Interfaces</i></li> </ul>                                                                                                                                                       |

## framing (SONET and SDH Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | framing (sdh   sonet);                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces so- <i>fpc/pic/port</i> ]                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | <p>This functionality allows you to mix SONET and SDH modes on interfaces on the same PIC.</p> <ul style="list-style-type: none"><li>• For the 4-port OC48 PIC with SFP installed and the 4-port OC192 PIC in T Series and M Series routers, configure SONET or SDH framing on a per-port basis.</li><li>• For 1-port OC192/STM64 MICs with XFP on MX Series routers, configure the SONET or SDH framing on the single port.</li></ul> |
| <b>Default</b>                  | Default framing mode is <b>SONET</b> .                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>sdh</b>—SDH framing.</p> <p><b>sonet</b>—SONET framing.</p>                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Framing Mode for Ports</i></li></ul>                                                                                                                                                                                                                                                                                                                                  |



## gigether-options

```

Syntax gigether-options {
 802.3ad {
 aex (primary | backup);
 lacp {
 port-priority;
 }
 }
 (asynchronous-notification | no-asynchronous-notification);
 (auto-negotiation | no-auto-negotiation) remote-fault <local-interface-online |
 local-interface-offline>;
 (flow-control | no-flow-control);
 ignore-l3-incompletes;
 (loopback | no-loopback);
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
 no-auto-mdix
 source-address-filter {
 mac-address;
 }
 (source-filtering | no-source-filtering);
 speed
 ethernet-switch-profile {
 (mac-learn-enable | no-mac-learn-enable);
 tag-protocol-id [tpids];
 ethernet-policer-profile {
 input-priority-map {
 ieee802.1p premium [values];
 }
 output-priority-map {
 classifier {
 premium {
 forwarding-class class-name {
 loss-priority (high | low);
 }
 }
 }
 }
 }
 policer cos-policer-name {
 aggregate {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 premium {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 }
 }
 }

```

```
}
```

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | Configure Gigabit Ethernet specific interface properties.<br><br>The statements are explained separately.                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Interfaces Overview</i></li><li>• <i>gether-options (ACX Series)</i></li></ul> |

---

## gratuitous-arp-reply

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (gratuitous-arp-reply   no-gratuitous-arp-reply);                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]<br>[edit interfaces <i>interface-range</i> <i>interface-range-name</i> ]       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | For Ethernet interfaces, enable updating of the Address Resolution Protocol (ARP) cache for gratuitous ARPs.            |
| <b>Default</b>                  | Updating of the ARP cache is disabled on all Ethernet interfaces.                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Interfaces Feature Guide for Security Devices</i></li></ul>                  |

## guard-interval

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>guard-interval <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring <i>ring-name</i></a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | When a link goes down, the ring protection link (RPL) activates. When the downed link comes back up, the RPL link receives notification, restores the link, and waits for the restore interval before issuing another block on the same link. This configuration is a global configuration and applies to all Ethernet rings if the Ethernet ring does not have a more specific configuration for this value. If no parameter is configured at the protection group level, the global configuration of this parameter uses the default value. |
| <b>Options</b>                  | <b><i>number</i></b> —Guard timer interval, in milliseconds.<br><b>Range:</b> 10 through 2000 ms<br><b>Default:</b> 500 ms                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul>                                                                                                                         |

## hardware-assisted-timestamping

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | hardware-assisted-timestamping;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | <p>For Ethernet interfaces on Enhanced and Enhanced Queuing Dense Port Concentrators (DPCs) in MX Series routers only, enable hardware-assisted timestamping support for Ethernet frame delay measurement.</p> <p>By default, the ETH-DM feature calculates frame delays using software-based timestamping of the ETH-DM PDU frames sent and received by the MEPs in the session. As an option that can increase the accuracy of ETH-DM calculations when the DPC is loaded with heavy traffic in the receive direction, you can enable hardware-assisted timestamping of session frames in the receive direction.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Frame Delay Measurements Overview</i></li><li>• <i>Guidelines for Configuring Routers to Support an ETH-DM Session</i></li><li>• <i>Enabling the Hardware-Assisted Timestamping Option</i></li></ul>                                                                                                                                                                                                                                                                                                                                                               |

## high-plp-threshold

|                                 |                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>high-plp-threshold percent;</code>                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options linear-red-profiles profile-name</a> ]                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS VC drop profile fill-level percentage when linear RED is applied to cells with high PLP. When the fill level exceeds the defined percentage, packets with high PLP are randomly dropped by RED. This statement is mandatory.                                                                        |
| <b>Options</b>                  | <b>percent</b> —Fill-level percentage when linear RED is applied to cells with PLP.                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <a href="#">high-plp-max-threshold on page 574</a></li> <li>• <a href="#">low-plp-max-threshold on page 663</a></li> <li>• <a href="#">low-plp-threshold on page 664</a></li> <li>• <a href="#">queue-depth on page 800</a></li> </ul> |

## hello-timer

|                                 |                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>hello-timer milliseconds;</code>                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                           |
| <b>Description</b>              | For link services and voice services interfaces only, configure the rate at which hello messages are sent. A hello message is transmitted after a period defined in milliseconds has elapsed.                               |
| <b>Options</b>                  | <b>milliseconds</b> —The rate at which hello messages are sent.<br><b>Range:</b> 1 through 180 milliseconds<br><b>Default:</b> 10 milliseconds                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">acknowledge-timer on page 392</a></li> <li>• <a href="#">address on page 397</a></li> </ul> |

## hierarchical-policer

---

**Syntax** hierarchical-policer *name* {  
aggregate {  
if-exceeding {  
bandwidth-limit *bandwidth*;  
burst-size-limit *burst*;  
}  
then {  
discard;  
}  
}  
premium {  
if-exceeding {  
bandwidth-limit *bandwidth*;  
burst-size-limit *burst*;  
}  
then {  
discard;  
}  
}  
}

**Hierarchy Level** [edit firewall]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, specify a hierarchical policer.

**Options** Options are described separately.

**Required Privilege Level** firewall—To view this statement in the configuration.  
firewall-control—To add this statement to the configuration.

**Related Documentation**

- [Applying Policers on page 203](#)
- *Class of Service Feature Guide for Routing Devices*

## hierarchical-scheduler (Subscriber Interfaces on MX Series Routers)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> hierarchical-scheduler {     implicit-hierarchy;     maximum-hierarchy-levels <i>number</i>; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 10.1.</p> <p><b>implicit-hierarchy</b> option added in Junos OS Release 13.1.</p> <p>Support on GRE tunnel interfaces configured on physical interfaces on MICs or MPCs in MX Series routers added in Junos OS Release 13.3.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>         | <p>Configure hierarchical scheduling options on the interface.</p> <p>The statement is supported on the following interfaces:</p> <ul style="list-style-type: none"> <li>• MIC and MPC interfaces in MX Series routers</li> <li>• GRE tunnel interfaces configured on physical interfaces hosted on MIC or MPC line cards in MX Series routers</li> </ul> <p>To enable hierarchical scheduling on MX Series routers, configure the <b>hierarchical-scheduler</b> statement at each member physical interface level of a particular aggregated Ethernet interface as well as at that aggregated Ethernet interface level. On other routing platforms, it is enough if you include this statement at the aggregated Ethernet interface level.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>             | <p><b>implicit-hierarchy</b>—Configure three-level hierarchical scheduling. When you include the <b>implicit-hierarchy</b> option, a hierarchical relationship is formed between the CoS scheduler nodes at level 1, level 2, and level 3. The <b>implicit-hierarchy</b> option is supported only on MPC/MIC subscriber interfaces and interface sets running over aggregated Ethernet on MX Series routers.</p> <p><b>maximum-hierarchy-levels <i>number</i></b>—Configure two-level hierarchical scheduling. Specify the maximum number of hierarchical scheduling levels allowed for node scaling. The only supported value is 2. The <b>maximum-hierarchy-levels</b> option is supported on MPC/MIC or EQ DPC subscriber interfaces and interface sets running over aggregated Ethernet on MX Series routers.</p> <ul style="list-style-type: none"> <li>• If you include the <b>maximum-hierarchy-levels</b> option, interface sets are allowed only at level 3; they are not allowed at level 2. In this case, if you configure a level 2 interface set, you generate Packet Forwarding Engine errors.</li> <li>• If you do not include the <b>maximum-hierarchy-levels</b> option, interface sets can be at either level 2 or level 3, depending on whether the member logical interfaces within the interface set have a traffic control profile. If any member logical interface has a traffic control profile, then the interface set is a level 2 CoS scheduler node. If no member logical interface has a traffic control profile, the interface set is at level 3.</li> </ul> |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Two-Level and Three-Level Hierarchical CoS for Subscriber Interfaces</i></li><li>• <i>Configuring Hierarchical CoS for a Subscriber Interface of Aggregated Ethernet Links</i></li><li>• <i>Configuring Hierarchical Schedulers for CoS</i></li><li>• <i>Configuring Hierarchical CoS on a Static PPPoE Subscriber Interface</i></li><li>• <i>Hierarchical CoS on MPLS Pseudowire Subscriber Interfaces Overview</i></li></ul> |

---

## high-plp-max-threshold

---

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | high-plp-max-threshold <i>percent</i> ;                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i> ]                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                        |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the drop profile fill-level for the high PLP CoS VC. When the fill level exceeds the defined percentage, all packets are dropped.                                                                                                    |
| <b>Options</b>                  | <i>percent</i> —Fill-level percentage when linear random early discard (RED) is applied to cells with PLP.                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li><li>• <a href="#">low-plp-max-threshold on page 663</a></li><li>• <a href="#">low-plp-threshold on page 664</a></li><li>• <a href="#">queue-depth on page 800</a></li></ul> |



## high-plp-threshold

|                                 |                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>high-plp-threshold <i>percent</i>;</code>                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options linear-red-profiles <i>profile-name</i></a> ]                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS VC drop profile fill-level percentage when linear RED is applied to cells with high PLP. When the fill level exceeds the defined percentage, packets with high PLP are randomly dropped by RED. This statement is mandatory.                                                                        |
| <b>Options</b>                  | <i>percent</i> —Fill-level percentage when linear RED is applied to cells with PLP.                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <a href="#">high-plp-max-threshold on page 574</a></li> <li>• <a href="#">low-plp-max-threshold on page 663</a></li> <li>• <a href="#">low-plp-threshold on page 664</a></li> <li>• <a href="#">queue-depth on page 800</a></li> </ul> |

## hold-interval (OAM)

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>hold-interval <i>minutes</i>;</code>                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <a href="#">continuity-check</a> ]                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in junos os release 12.1X48 for PTX Series Packet Transport Routers.                                                                                |
| <b>Description</b>              | The time to wait before flushing the maintenance association end point (MEP) database, if no updates occur. The configurable range is 1 minute through 30240 minutes.                                                     |
| <b>Options</b>                  | <i>minutes</i> —Time to wait, in minutes.                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Continuity Check Protocol Parameters for Fault Detection</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |

## hold-interval (Protection Group)

---

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | hold-interval <i>number</i> ;                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring name</a> ]                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Specify the hold-off timer interval <i>for all rings</i> in 100 millisecond (ms) increments.                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b><i>number</i></b> —Hold-timer interval, in milliseconds.<br><b>Range:</b> 0 through 10,000 ms<br><b>Default:</b> 100 ms                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li></ul> |

## hold-time (APS)

---

|                                 |                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | hold-time <i>milliseconds</i> ;                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                     |
| <b>Description</b>              | Hold-time value to use to determine whether a neighbor APS router is operational.                                                                                     |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —Hold-time value.<br><b>Range:</b> 1 through 65,534 milliseconds<br><b>Default:</b> 3000 milliseconds (3 times the advertisement interval) |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring APS Timers</i></li><li>• <a href="#">advertise-interval on page 400</a></li></ul>                              |

## hold-time (Physical Interface)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>hold-time up <i>milliseconds</i> down <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces interface-range <i>interface-range-name</i>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 10.4R5 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>         | Specify the <b>hold-time</b> value to use to damp shorter interface transitions milliseconds. The hold timer enables interface damping by not advertising interface transitions until the hold timer duration has passed. When a hold-down timer is configured and the interface goes from up to down, the down hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still down, then the router begins to advertise the interface as being down. Similarly, when a hold-up timer is configured and an interface goes from down to up, the up hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still up, then the router begins to advertise the interface as being up. |



### NOTE:

- We recommend that you configure the hold-time value after determining an appropriate value by performing repeated tests in the actual hardware environment. This is because the appropriate value for hold-time depends on the hardware (XFP, SFP, SR, ER, or LR) used in the networking environment.
- The hold-time option is not available for controller interfaces.



**NOTE:** On MX Series routers with MPC3E and MPC4E, we recommend that you do not configure the hold-down timer to be less than 1 second. On MX Series routers with MPC5EQ-100G10G (MPC5EQ) or MPC6E (MX2K-MPC6E) with 100-Gigabit Ethernet MIC with CFP2 OTN interfaces, we recommend that you do not configure the hold-down timer to be less than 3 seconds.

|                |                                                                                                                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b> | Interface transitions are not damped.                                                                                                                                                            |
| <b>Options</b> | <code>down <i>milliseconds</i></code> —Hold time to use when an interface transitions from up to down. Junos OS advertises the transition within 100 milliseconds of the time value you specify. |

**Range:** 0 through 4,294,967,295

**Default:** 0 (interface transitions are not damped)

**up *milliseconds***—Hold time to use when an interface transitions from down to up. Junos OS advertises the transition within 100 milliseconds of the time value you specify.

**Range:** 0 through 4,294,967,295

**Default:** 0 (interface transitions are not damped)

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

- |                              |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">advertise-interval on page 400</a></li><li>• <a href="#">interfaces (for EX Series switches)</a></li><li>• <a href="#">Physical Interface Damping Overview on page 139</a></li><li>• <a href="#">Damping Shorter Physical Interface Transitions on page 145</a></li><li>• <a href="#">Damping Longer Physical Interface Transitions on page 146</a></li></ul> |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## hold-time (SONET/SDH Defect Triggers)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>hold-time up <i>milliseconds</i> down <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> sonet-options <b>trigger defect</b> ]                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>         | For ATM over SONET/SDH and SONET/SDH interfaces only, apply up and down hold times to SONET/SDH defect triggers. When you apply a down hold time to a defect, the defect must remain present for at least the hold-time period before the interface is marked down. When you apply an up hold time to a defect, the defect must remain absent for at least the hold-time period before the interface is marked up, assuming no other defect is outstanding. |



### NOTE:

- When up or down hold times are applied to SONET defect triggers of a 10-Gigabit Ethernet WAN-PHY interface, only the defects generated in the WAN Interface Sublayer (WIS) are damped. Therefore, if the hold times are applied to SONET defect triggers only, a 10-Gigabit Ethernet WAN-PHY interface might be marked up or down because of the faults that are generated in other layers, such as the Physical Coding Sublayer (PCS) or Physical Medium Attachment Sublayer (PMA), 10 Gigabit Media Independent Interface (XGMII) Extender Sublayer (XGXS), and Media Access Control (MAC). To damp the interface up or down events of a 10-Gigabit Ethernet WAN-PHY interface, you need to apply up or down hold-times for the interface at the [edit interfaces *interface-name*] hierarchy level.
- On M Series and T Series platforms with Channelized SONET IQ PICs and Channelized SONET IQE PICs, the SONET defect alarm trigger hold-time statement is not supported.

|                |                                                                                                                                                                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b> | If you do not include this statement, when a defect is detected the interface is marked down immediately, and when the defect becomes absent the interface is marked up immediately.                                                                                                                                                                          |
| <b>Options</b> | <p><b>down <i>milliseconds</i></b>—Hold time to wait before the interface is marked down.<br/> <b>Range:</b> 1 through 65,534 milliseconds<br/> <b>Default:</b> No hold time</p> <p><b>up <i>milliseconds</i></b>—Hold time to wait before the interface is marked up.<br/> <b>Range:</b> 1 through 65,534 milliseconds<br/> <b>Default:</b> No hold time</p> |

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring SONET/SDH Defect Triggers*
- [hold-time \(Physical Interface\) on page 577](#)

---

## host (Interfaces)

---

**Syntax** `host hostname {  
    services severity-level;  
    facility-override facility-name;  
    log-prefix prefix-value;  
    port port-number;  
}`

**Hierarchy Level** [edit interfaces *interface-name* services-options syslog]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Specify the hostname for the system logging utility.

**Options** *hostname*—Name of the system logging utility host machine. This can be the local Routing Engine or an external server address.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Applying Filters and Services to Interfaces*

## iccp

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> iccp {     traceoptions; {         file &lt;filename&gt; &lt;files number&gt; &lt;match regular-expression&gt; &lt;microsecond-stamp&gt;         &lt;size size&gt; &lt;world-readable   no-world-readable&gt;;         flag flag;         no-remote-trace;     }     local-ip-address ip address;     session-establishment-hold-time value;     authentication-key string;     peer ip-address {         local-ip-address ip address;         session-establishment-hold-time value;         authentication-key string;         redundancy-group-id-list redundancy-group-id-list;         liveness-detection;     } } </pre>                                                                                                                        |
| <b>Hierarchy Level</b>          | <pre> [edit protocols iccp] [edit logical-systems logical-system-name protocols iccp] </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 10.0.</p> <p>Support for logical systems introduced in Junos OS Release 14.1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Configure Interchassis Control Protocol (ICCP) between the multichassis link aggregation group (MC-LAG) peers. ICCP replicates forwarding information, validates configurations, and propagates the operational state of the MC-LAG members.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>                  | <p>If you do not include this statement, no ICCP protocol tracing operations are performed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>traceoptions</b>—Set Interchassis Control Protocol (ICCP) tracing options.</p> <p><b>local-ip-address</b>—Specify the source address where the ICCP packet is routed.</p> <p><b>session-establishment-hold-time</b>—Specify if the chassis takes over as the master at the ICCP session.</p> <p><b>authentication-key</b>—Specify TCP Message Digest 5 (MD5) option for an ICCP TCP session.</p> <p><b>peer ip-address</b>—Specify the IP address of the peer that hosts an MC-LAG. You must configure ICCP for both peers that host the MC-LAG.</p> <p><b>redundancy-group-id-list</b>—Specify the redundancy groups between two ICCP peers.</p> <p><b>liveness-detection</b>—Specify Bidirectional Forwarding Detection (BFD) protocol options.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

- Related Documentation**
- [Configuring ICCP for MC-LAG on page 191](#)

## idle-cycle-flag

**Syntax** `idle-cycle-flag value;`

**Hierarchy Level**

```
[edit interfaces e1-fpc/pic/port],
[edit interfaces t1-fpc/pic/port],
[edit interfaces interface-name ds0-options],
[edit interfaces interface-name e1-options],
[edit interfaces interface-name e3-options],
[edit interfaces interface-name serial-options],
[edit interfaces interface-name t1-options],
[edit interfaces interface-name t3-options]
```

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description** Configure the value that the DS0, E1, E3, T1, or T3 interface transmits during idle cycles.



**NOTE:** When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `idle-cycle-flag` statement must be included at the `[edit interfaces e1-fpc/pic/port]` or `[edit interfaces t1-fpc/pic/port]` hierarchy level as appropriate.

**Options** **value**—Value to transmit in the idle cycles:

- **flags**—Transmit the value 0x7E.
- **ones**—Transmit the value 0xFF (all ones).

**Default:** `Flags`

**Required Privilege Level** `interface`—To view this statement in the configuration.  
`interface-control`—To add this statement to the configuration.

- Related Documentation**
- [Configuring the E1 Idle Cycle Flag](#)
  - [Configuring the E3 Idle Cycle Flag](#)
  - [Configuring the T1 Idle Cycle Flag](#)
  - [Configuring the T3 Idle Cycle Flag](#)



## ieee802.1p

|                                 |                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ieee802.1p premium [ <i>values</i> ];                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile input-priority-map</a> ]<br>[edit interfaces <i>interface-name</i> ether-options <a href="#">ethernet-switch-profile ethernet-policer-profile input-priority-map</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos Release 7.4.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.                                                                                                                                                                         |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, configure premium priority values for IEEE 802.1p input traffic.                                                                                                                                                           |
| <b>Options</b>                  | <b>values</b> —Define IEEE 802.1p priority values to be treated as premium.<br><b>Range:</b> 0 through 7                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying an Input Priority Map</a></li> </ul>                                                                                                                                                                                        |

## if-exceeding

|                                 |                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | if-exceeding {<br>bandwidth-limit <i>bandwidth</i> ;<br>burst-size-limit <i>burst</i> ;<br>}                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit firewall hierarchical-policer aggregate],<br>[edit firewall hierarchical-policer premium]                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                        |
| <b>Description</b>              | For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, specify bandwidth and burst limits for an aggregate level of a hierarchical policer. |
| <b>Options</b>                  | Options are described separately.                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying Policers on page 203</a></li> <li>• <a href="#">Class of Service Feature Guide for Routing Devices</a></li> </ul>                                                      |

## igmp-snooping

---

**Syntax** `igmp-snooping {  
 immediate-leave;  
 interface interface-name {  
 group-limit limit;  
 host-only-interface;  
 immediate-leave;  
 multicast-router-interface;  
 static {  
 group ip-address {  
 source ip-address;  
 }  
 }  
 }  
 proxy {  
 source-address ip-address;  
 }  
 query-interval seconds;  
 query-last-member-interval seconds;  
 query-response-interval seconds;  
 robust-count number;  
 vlan vlan-id {  
 immediate-leave;  
 interface interface-name {  
 group-limit limit;  
 host-only-interface;  
 immediate-leave;  
 multicast-router-interface;  
 static {  
 group ip-address {  
 source ip-address;  
 }  
 }  
 }  
 proxy {  
 source-address ip-address;  
 }  
 query-interval seconds;  
 query-last-member-interval seconds;  
 query-response-interval seconds;  
 robust-count number;  
 }  
}`

**Hierarchy Level** [edit bridge-domains *bridge-domain-name* protocols],  
[edit routing-instances *routing-instance-name* bridge-domains *bridge-domain-name* protocols]  
[edit routing-instances *routing-instance-name* protocols]  
[edit protocols]

**Release Information** Statement introduced in Junos OS Release 8.5.

**Description** Enable IGMP snooping on the router.



**NOTE:** IGMP snooping must be disabled on the router before enabling ISSU.

|                                 |                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | IGMP snooping is disabled on the router.                                                                                                            |
| <b>Options</b>                  | The statements are explained separately.                                                                                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Understanding IGMP Snooping</i></li> <li>• <i>IGMP Snooping in MC-LAG Active-Active Mode</i></li> </ul> |

## ignore

|                                 |                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ignore;                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">trigger defect</a> ]                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                      |
| <b>Description</b>              | For ATM over SONET/SDH and SONET/SDH interfaces only, ignore a specific SONET/SDH defect trigger.                                                                      |
| <b>Default</b>                  | If you do not include this statement, all defects are honored with no hold time.                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring SONET/SDH Defect Triggers</i></li> <li>• <a href="#">hold-time (Physical Interface) on page 577</a></li> </ul> |

## ignore-all

---

|                                 |                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ignore-all;                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                            |
| <b>Description</b>              | Ignore all control leads. You can include the <b>ignore-all</b> statement in the configuration only if you do not explicitly enable other signal handling options at the <b>dte-options</b> hierarchy level. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li></ul>                                                                                         |

## ignore-l3-incompletes

---

|                                 |                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ignore-l3-incompletes;                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                  |
| <b>Description</b>              | Ignore the counting of Layer 3 incomplete errors on Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces.                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Ignoring Layer 3 Incomplete Errors</a></li></ul>                                                     |

---

## ilmi

---

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ilmi;                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options]                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Enable the router to communicate with directly attached ATM switches and routers. The router uses the VC 0.16 to communicate with the ATM switch or router. Once configured, you can display the IP address and port number of an ATM switch or router using the <b>show interfaces <i>interface-name</i> switch-id</b> command. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Communication with Directly Attached ATM Switches and Routers</i></li><li>• <i>show ilmi</i></li><li>• <i>show ilmi statistics</i></li></ul>                                                                                                                              |

## ima-group-options

---

**Syntax**    `ima-group-options {  
          differential-delay number;  
          frame-length (32 | 64 | 128 | 256);  
          frame-synchronization {  
            alpha number;  
            beta number;  
            gamma number;  
          }  
          minimum-links number;  
          symmetry (symmetrical-config-and-operation |  
            symmetrical-config-asymmetrical-operation);  
          test-procedure {  
            ima-test-start;  
            ima-test-stop;  
            interface name;  
            pattern number;  
            period number;  
          }  
          transmit-clock (common | independent);  
          version (1.0 | 1.1);  
          }`

**Hierarchy Level**    `[edit interfaces (t1-fpc/pic/port:m:n | e1-fpc/pic/port:n | t1|e1-fpc/pic/port)]`

**Release Information**    Statement introduced in Junos OS Release 10.0.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description**    Specify IMA group options.

**Options**    **differential-delay *msec***—Maximum differential delay among links in msec.

**Range:** 1 through 56

**Default:** 25

**frame-length (32 | 64 | 128 | 256)**—IMA frame length in number of cells.

**Default:** 128

**frame-synchronization**—IMA group frame synchronization selection.

**alpha *number***—Number of consecutive invalid ICP cells for IFSM.

**Range:** 1 through 2

**Default:** 2

**beta *number***—Number of consecutive errored ICP cells for IFSM.

**Range:** 1 through 2

**Default:** 2

**gamma *number***—Number of consecutive valid ICP cells for IFSM.

**Range:** 1 through 5

**Default:** 1

**minimum-links *number***—IMA group minimum active links.

**Range:** 1 through 8

**Default:** 1

**symmetry (symmetrical-config-and-operation |  
symmetrical-config-asymmetrical-operation)**—IMA group symmetry mode selection.

**test-procedure**—Specify an IMA link interface test.

**ima-test-start**—Start IMA group test.

**ima-test-stop**—Stop IMA group test.

**interface *name***—Interface name of the IMA link to test.

**pattern *number***—IMA test pattern.

**Range:** 1 through 254

**Default:** 170

**period *seconds***—Length of IMA pattern test in seconds.

**Range:** 1 through 4,294,967,294.

**Default:** 10

**transmit-clock (common |independent)**—Transmit clock configuration.

**Default:** common

**version (1.0 |1.1)**—IMA specification version.

|                                 |                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM Support on Circuit Emulation PICs Overview</i></li> <li>• <a href="#">ima-link-options on page 590</a></li> <li>• <i>Understanding Inverse Multiplexing for ATM</i></li> </ul> |

## ima-link-options

---

|                                 |                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ima-link-options group <i>g</i></code>                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <code>[edit interfaces (<i>t1-fpc/pic/port:m:n</i>   <i>e1-fpc/pic/port:n</i>   <i>t1 e1-fpc/pic/port</i>) ]</code>                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                 |
| <b>Description</b>              | Specify an interface as a member of an IMA group.                                                                                                                                                                            |
| <b>Options</b>                  | <b>group <i>g</i></b> —Implying <b>at-x/y/g</b> .                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM Support on Circuit Emulation PICs Overview</i></li><li>• <a href="#">ima-group-options on page 588</a></li><li>• <i>Inverse Multiplexing for ATM (IMA) Overview</i></li></ul> |

## inactivity-timeout

---

|                                 |                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>inactivity-timeout <i>seconds</i>;</code>                                                                                                                                      |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> <a href="#">services-options</a>]</code>                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                    |
| <b>Description</b>              | For adaptive services interfaces, configure the inactivity timeout period for established flows. The timeout configured in the application protocol definition overrides this value. |
| <b>Options</b>                  | <b><i>seconds</i></b> —Timeout period, in seconds.<br><b>Range:</b> 4 through 86,400 seconds<br><b>Default:</b> 30 seconds                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                    |



## indication

---

|                                 |                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>indication (ignore   normal   require);</code>                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                              |
| <b>Description</b>              | For X.21 interfaces only, configure the from-DCE signal indication.                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>ignore</b>—The from-DCE signal is ignored.</p> <p><b>normal</b>—Normal indication signal handling as defined by ITU-T Recommendation X.21.</p> <p><b>require</b>—The from-DCE signal must be asserted.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                         |

## indication-polarity

---

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>indication-polarity (negative   positive);</code>                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | For X.21 interfaces only, configure the indication signal polarity.                                                                |
| <b>Options</b>                  | <p><b>positive</b>—Positive signal polarity.</p> <p><b>negative</b>—Negative signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>               |

## ingress-policer-overhead

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>ingress-policer-overhead bytes;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>     | <code>[edit chassis fpc slot-number pic pic-number]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b> | Statement introduced before Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 15.1X49-D30 for vSRX.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>         | <p>Add the configured number of bytes to the length of a packet entering the interface.</p> <p>Configure a policer overhead to control the rate of traffic received on an interface. Use this feature to help prevent denial-of-service (DoS) attacks or to enforce traffic rates to conform to the service-level agreement (SLA). When you configure a policer overhead, the configured policer overhead value (bytes) is added to the length of the final Ethernet frame. This calculated length of frame is used to determine the policer or the rate-limiting action.</p> <p>Traffic policing combines the configured policy bandwidth limits and the burst size to determine how to meter the incoming traffic. If you configure a policer overhead on an interface, Junos OS adds those bytes to the length of incoming Ethernet frames. This added overhead fills each frame closer to the burst size, allowing you to control the rate of traffic received on an interface.</p> <p>You can configure the policer overhead to rate-limit queues and Layer 2 and Layer 3 policers, for standalone (SA) and high-availability (HA) deployments. The policer overhead and the shaping overhead can be configured simultaneously on an interface.</p> |



**NOTE:** vSRX supports policer overhead on Layer 3 policers only.

---

The policer overhead applies to all interfaces on the PIC. In the following example, Junos OS adds 10 bytes of overhead to all incoming Ethernet frames on ports ge-0/0/0 through ge-0/0/4.

```
set chassis fpc 0 pic 0 ingress-policer-overhead 10
```

---



**NOTE:** vSRX only supports fpc 0 pic 0. When you commit the `ingress-policer-overhead` statement, the vSRX takes the PIC offline and then back online.

---

You need to craft the policer overhead size to match your network traffic. A value that is too low will have minimal impact on traffic bursts. A value that is too high will rate-limit too much of your incoming traffic.

In this example, the policer overhead of 255 bytes is configured for ge-0/0/0 through ge-0/0/4. The firewall policer is configured to discard traffic when the burst size is over

1500 bytes. This policer is applied to ge-0/0/0 and ge 0/0/1. Junos OS adds 255 bytes to every Ethernet frame that comes into the configured ports. If, during a burst of traffic, the combined length of incoming frames and the overhead bytes exceeds 1500 bytes, the policer starts to discard further incoming traffic.

```
set chassis fpc 0 pic 0 ingress-policer-overhead 255
set interfaces ge-0/0/0 unit 0 family inet policer input overhead_policer
set interfaces ge-0/0/0 unit 0 family inet address 10.9.1.2/24
set interfaces ge-0/0/1 unit 0 family inet policer input overhead_policer
set interfaces ge-0/0/1 unit 0 family inet address 10.9.2.2/24
set firewall policer overhead_policer if-exceeding bandwidth-limit 32k
set firewall policer overhead_policer if-exceeding burst-size-limit 1500
set firewall policer overhead_policer then discard
```

**Options** *bytes*—Number of bytes added to a frame entering an interface.  
**Range:** 0–255 bytes  
**Default:** 0

```
[edit chassis fpc 0 pic 0]
user@host# set ingress-policer-overhead 10;
```

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- [set firewall policer](#)

## ingress-rate-limit

**Syntax** `ingress-rate-limit rate;`

**Hierarchy Level** [edit interfaces *interface-name* fastether-options]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Perform port-based rate limiting on ingress traffic arriving on Fast Ethernet 8-port, 12-port, and 48-port PICs.

**Options** *rate*—Traffic rate, in megabits per second (Mbps).  
**Range:** 1 through 100 Mbps

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring the Ingress Rate Limit](#)

## inner-tag-protocol-id

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>inner-tag-protocol-id <i>tpid</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">input-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">output-vlan-map</a>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>Configure the IEEE 802.1Q TPID value to rewrite for the inner tag.</p> <p>All TPIDs you include in input and output VLAN maps must be among those you specify at the <code>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> <a href="#">ethernet-switch-profile</a> <a href="#">tag-protocol-id</a> [ <i>tpids</i> ]]</code> hierarchy level.</p> <p>On MX Series routers, you can use this statement for Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs.</p>                     |
| <b>Default</b>                  | If the <code>inner-tag-protocol-id</code> statement is not configured, the TPID value is 0x8100.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring Inner and Outer TPIDs and VLAN IDs</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## inner-vlan-id

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>inner-vlan-id <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>input-vlan-map</b>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>input-vlan-map</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers or 100-Gigabit Ethernet Type 5 PIC with CFP, or on Ethernet interfaces on EX Series switches, specify the VLAN ID to rewrite for the inner tag of the final packet.</p> <p>You cannot include the <b>inner-vlan-id</b> statement with the <b>swap</b> statement, <b>swap-push</b> statement, <b>push-push</b> statement, or <b>push-swap</b> statement and the <b>inner-vlan-id</b> statement at the [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>] hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the <b>inner-vlan-id</b> statement you include at the [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>] hierarchy level.</p> |
| <b>Options</b>                  | <p><i>number</i>—VLAN ID number.</p> <p><b>Range:</b> 0 through 4094</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Inner and Outer TPIDs and VLAN IDs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## inner-vlan-id-range

---

|                                 |                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>inner-vlan-id-range start <i>start-id</i> end <i>end-id</i>;</code>                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                   |
| <b>Description</b>              | The range of VLAN IDs to be used in the ATM-to-Ethernet interworking cross-connect. Specify the starting VLAN ID and ending VLAN ID.                                                                            |
| <b>Options</b>                  | <b><i>start-id</i></b> —The lowest VLAN ID to be used.<br><br><b><i>end-id</i></b> —The highest VLAN ID to be used.<br><b>Range:</b> 32 through 4094                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 254</a></li></ul>                                                                                          |

## input

---

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>input {<br/>  <b>service-set</b> <i>service-set-name</i> &lt;<b>service-filter</b> <i>filter-name</i>&gt;;<br/>  <b>post-service-filter</b> <i>filter-name</i>;<br/>}</pre>                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                  |
| <b>Description</b>              | Define one or more input service sets and filters, and one postservice filter to be applied to traffic.                                                                                                                                                            |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                  |

## input-list

---

|                                 |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>input-list [ <i>filter-names</i> ];</code>                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Apply a group of filters to evaluate when packets are received on an interface.                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <b>[ <i>filter-names</i> ]</b> —Name of a filter to evaluate when packets are received on the interface.<br>Up to 16 filters can be included in a filter input list.                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying a Filter to an Interface on page 212</a></li> <li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> <li>• <a href="#">output-list on page 739</a></li> </ul>  |

## input-policer

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>input-policer <i>policer-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Apply a single-rate two-color policer to the Layer 2 input traffic at the logical interface. The <b>input-policer</b> and <b>input-three-color</b> statements are mutually exclusive.                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <b><i>policer-name</i></b> —Name of the single-rate two-color policer that you define at the <b>[edit firewall]</b> hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <a href="#">input-three-color on page 600</a></li><li>• <a href="#">layer2-policer on page 631</a></li><li>• <a href="#">logical-interface-policer on page 655</a></li><li>• <a href="#">output-policer on page 740</a></li><li>• <a href="#">output-three-color on page 742</a></li></ul> |



## input-priority-map

---

|                                 |                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | input-priority-map {<br><a href="#">ieee802.1p</a> premium [ <i>values</i> ];<br>}                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a><br><a href="#">ethernet-policer-profile</a> ]<br>[edit interfaces <i>interface-name</i> ether-options <a href="#">ethernet-switch-profile</a><br><a href="#">ethernet-policer-profile</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.                                                                                                                                                                      |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the input policer priority map to be applied to incoming frames on this interface.<br><br>The statements are explained separately.                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Input Priority Map</i></li> <li>• <a href="#">output-priority-map on page 741</a></li> </ul>                                                                                                                                      |

## input-three-color

---


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>input-three-color <i>policer-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Apply a single-rate or two-rate three-color policer to the Layer 2 input traffic at the logical interface. The <b>input-three-color</b> and <b>input-policer</b> statements are mutually exclusive.                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b><i>policer-name</i></b> —Name of the single-rate or two-rate three-color policer.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Usage Guidelines</b>         | See <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <a href="#">input-policer on page 598</a></li><li>• <a href="#">layer2-policer on page 631</a></li><li>• <a href="#">logical-interface-policer on page 655</a></li><li>• <a href="#">output-policer on page 740</a></li><li>• <a href="#">output-three-color on page 742</a></li></ul> |

## input-vlan-map (Aggregated Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>input-vlan-map {   (pop   push   swap);   tag-protocol-id <i>tpid</i>;   vlan-id <i>number</i>; }</pre>                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</pre>                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>For aggregated Ethernet interfaces using Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E interfaces and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite profile to be applied to incoming frames on this logical interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Stacking a VLAN Tag</i></li> <li>• <a href="#">output-vlan-map (Aggregated Ethernet) on page 743</a></li> </ul>                                                                                                                                                 |

## input-vlan-map

---

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <pre>input-vlan-map {<br/>    (pop   pop-pop   pop-swap   push   push-push   swap   swap-push   swap-swap);<br/>    inner-tag-protocol-id <i>tpid</i>;<br/>    inner-vlan-id <i>number</i>;<br/>    tag-protocol-id <i>tpid</i>;<br/>    vlan-id <i>number</i>;<br/>}</pre>                                                                                   |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Statement introduced before Junos OS Release 7.4.<br><b>pop-pop</b> , <b>pop-swap</b> , <b>push-push</b> , <b>swap-push</b> , and <b>swap-swap</b> statements introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 13.2X50-D15 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series. |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | For Gigabit Ethernet IQ, 10-Gigabit Ethernet SFPP interfaces, 100-Gigabit Ethernet Type 5 PIC with CFP only as well as Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces, define the rewrite profile to be applied to incoming frames on this logical interface.<br><br>The statements are explained separately. |
| <div> <b>NOTE:</b> Connectivity fault management (CFM) sessions for all interfaces in which input-vlan-map is configured are supported only if the interface also has an explicit configuration for output-vlan-map as output-vlan-map pop;. See <a href="#">output-vlan-map</a>. This configuration is required for all the interfaces in the topology even when the CFM session is on that interface or on a different interface in the data path of the same topology.</div> |                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>• <i>Stacking a VLAN Tag</i></li><li>• <a href="#">output-vlan-map on page 744</a></li><li>• <i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li></ul>                                                                                                                                                              |

## instance

---

|                                 |                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>instance <i>vpls-instance-name</i>;</code>                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>name</i> ]                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                                                                           |
| <b>Description</b>              | Specify the VPLS instance of the default maintenance domain.                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Maintenance Intermediate Points (MIPs)</i></li> <li>• <a href="#">maintenance-domain on page 671</a></li> </ul> |

## interface (Hierarchical CoS Schedulers)

---

|                                 |                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>interface <i>interface-name</i>;</code>                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">interface-set</a> <i>interface-set-name</i> ]                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                          |
| <b>Description</b>              | Specify an interface that is a member of the interface set. Supported on Ethernet interfaces on an MX Series router, Ethernet interfaces on IQ2E PIC on M Series and T Series routers, and IP demux interfaces on an MX Series router. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Class of Service Feature Guide for Routing Devices</i></li> </ul>                                                                                                                          |

## interface (IEEE 802.1x)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>interface <i>interface-id</i> {<br/>    maximum-requests <i>integer</i>;<br/>    quiet-period <i>seconds</i>;<br/>    reauthentication (disable   interval <i>seconds</i>);<br/>    retries <i>integer</i>;<br/>    server-timeout <i>seconds</i>;<br/>    supplicant (<i>single</i>);<br/>    supplicant-timeout <i>seconds</i>;<br/>    transmit-period <i>seconds</i>;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | [edit protocols <a href="#">dot1x authenticator</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>         | Use this statement to configure the 802.1x Port-Based Network Access Control protocol-specific Ethernet interface options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>             | The default values are provided for the options below on the respective statement pages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>             | <p><b>maximum-requests</b>—Specify the maximum number of retransmission times for an EAPOL Request packet to the client before it times out the authentication session.</p> <p><b>quiet-period</b>—Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting the authentication.</p> <p><b>reauthentication</b>—Includes two options:</p> <ul style="list-style-type: none"><li>• <b>disable</b>—Periodic reauthentication of the client is disabled.</li><li>• <b>interval</b>—Specify the periodic reauthentication time interval.</li></ul> <p><b>retries</b>—Specify the number of tries after which the port remains in the wait state for <b>quiet-period</b> seconds before reattempting the authentication.</p> <p><b>server-timeout</b>—Specify the number of seconds the port waits for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.</p> <p><b>supplicant (<i>single</i>)</b>—Specify supplicant single mode. See the usage guidelines to configure other modes.</p> <p><b>supplicant-timeout</b>—Specify the number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.</p> <p><b>transmit-period</b>—Specify the number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.</p> |

**Required Privilege** interface—To view this statement in the configuration.  
**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- *IEEE 802.1x Port-Based Network Access Control Overview*
- [authenticator on page 420](#)
- [dot1x on page 498](#)

## interface (IEEE 802.1ag OAM Connectivity-Fault Management)

**Syntax** `interface (interface-name | ((ge- | xe-) (fpc/pic/port | fpc/pic/port.unit-number | fpc/pic/port.unit-number vlan vlan-id)));`

**Hierarchy Level** [edit protocols [oam ethernet connectivity-fault-management](#) maintenance-domain *domain-name* maintenance-association *ma-name* [mep mep-id](#)]

**Release Information** Statement introduced in Junos OS Release 8.4.

**Description** For Ethernet interfaces on M320, MX Series, and T Series routers, configure IEEE 802.1ag Operation, Administration, and Management (OAM) support.

For Gigabit Ethernet interfaces and 10-Gigabit Ethernet interfaces on MX Series routers, configure IEEE 802.1ag Connectivity Fault Management (CFM) support on trunk interface ports.

**Options** **interface-name**—Interface to which the MEP is attached. It could be a physical Ethernet interface, logical Ethernet interface, or on a specific VLAN of a trunk port interface (MX Series only).

**Required Privilege** interface—To view this statement in the configuration.  
**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring a MEP to Generate and Respond to CFM Protocol Messages*

## interface (OAM Link-Fault Management)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>interface <i>interface-name</i> {<br/>  apply-action-profile <i>profile-name</i>;<br/>  link-discovery (active   passive);<br/>  pdu-interval <i>interval</i>;<br/>  pdu-threshold <i>threshold-value</i>;<br/>  remote-loopback;<br/>  event-thresholds {<br/>    frame-error <i>count</i>;<br/>    frame-period <i>count</i>;<br/>    frame-period-summary <i>count</i>;<br/>    symbol-period <i>count</i>;<br/>  }<br/>  negotiation-options {<br/>    allow-remote-loopback;<br/>    no-allow-link-events;<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For Ethernet interfaces on M320, MX Series, and T Series routers, configure IEEE 802.3ah Operation, Administration, and Management (OAM) support.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b>interface</b> <i>interface-name</i>—Interface to be enabled for IEEE 802.3ah link fault management OAM support.</p> <p>The remaining statements are described separately.</p>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling IEEE 802.3ah OAM Support</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |



## interface (Port Mirroring)

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>interface <i>interface-name</i> {<br/>    next-hop <i>address</i>;<br/>}</code>                                   |
| <b>Hierarchy Level</b>          | [edit forwarding-options port-mirroring family (inet   inet6) output]                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Specify the output interface for sending copies of packets elsewhere to be analyzed.                                    |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface.<br><br>The remaining statements are explained separately.                 |
| <b>Usage Guidelines</b>         | See <i>Configuring Port Mirroring</i> .                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |

## interface-down

---

|                                 |                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>interface-down;</code>                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet <a href="#">connectivity-fault-management action-profile <i>profile-name</i></a> <a href="#">default-actions</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                   |
| <b>Description</b>              | Bring the interface down when a remote MEP connectivity failure is detected.                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a CFM Action Profile to Specify CFM Actions for CFM Events</i></li> </ul>               |

## interface-name

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interface-name;                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ],                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Append the interface name and VLAN ID or stacked VLAN ID to the username string used for authentication. The appended information takes the following format: <ul style="list-style-type: none"><li>• For single VLAN—&lt;interface-name&gt;:&lt;4-digit-vlan-id&gt;</li><li>• For stack VLANs—&lt;interface-name&gt;:&lt;4-digit-svlan-id&gt;-&lt;4-digit-vlan-id&gt;</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>                                                                                                                                                                                                                                                  |

## interface-none

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interface-none;                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring ring-name east-interface</a> ]<br>[edit protocols <a href="#">protection-group ethernet-ring ring-name west-interface</a> ]                                                                                                                                                                                |
| <b>Description</b>              | Designates port as not used for Ethernet ring protection.                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul> |

## interface-range

**Syntax** `interface-range name {  
     member-range interface-name-fpc/pic/port to interface-name-fpc/pic/port;  
     member interface-name-fpc/pic/port;  
     member interface-name-fpc/[low-high]/*;  
     member interface-name-fpc/[pic1,pic2,pic3...picN]/port  
     /*Common config is added as part of interface-range definition, as follows*/  
     mtu 256;  
     hold-time up 10;  
     ether-options {  
         flow-control;  
         speed {  
             100m;  
         }  
         802.3ad primary;  
     }  
}`

**Hierarchy Level** [edit [interfaces](#)]

**Release Information** Statement introduced in Junos OS Release 10.0.

**Description** Specify a set of identical interfaces as an interface group, to which you can apply a common configuration to the entire set of interfaces. This group can consist of both lexical member ranges of interfaces specified using the **member-range** *interface-type-fpc/pic/port* to *xx-fpc/pic/port* option (regex not supported), and of individual or non-sequential members using the **member** *interface-type-fpc/pic/port* option (with regex support to specify the *fpc/pic/port* values).

**Options** **member-range**—Adds interfaces in lexical order. Regex is not supported.

**Format:**—**member-range** <start-range> to <end-range>

**Example:**—**member-range** ge-0/0/0 to ge-4/0/40;

**member**—To add individual interfaces or multiple interfaces using regex.

**Format:**—**member** <list of interface names>

**Example:**—**member** ge-0/0/0;

**member** ge-0/1/1;

**member** ge-0/\*/\*;

**member** ge-0/[1-10]/0;

**member** ge-1/[1,3,6,10]/12

**Required Privilege** interface—To view this statement in the configuration.

**Level** interface-control—To add this statement to the configuration.

- Related Documentation**
- [Configuring Interface Ranges on page 84](#)

---

## interface-transmit-statistics

---

|                            |                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | interface-transmit-statistics;                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit interface <i>interface-name</i> ]                                                                                                                                                                                          |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.4 R3 for MX Series devices.                                                                                                                                                          |
| <b>Description</b>         | Configure the interface to report the transmitted load statistics. If this statement is not included in the configuration, the interface statistics show the offered load on the interface, and not the actual transmitted load. |



**NOTE:** This is not supported on Enhanced IQ (IQE) and Enhanced IQ2 (IQ2E) PICs.

|                                 |                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Improvements to Interface Transmit Statistics Reporting on page 965</a></li><li>• <a href="#">show interfaces (Gigabit Ethernet) on page 1137</a></li></ul> |

---

## interface-set (Ethernet Interfaces)

---

|                                 |                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>interface-set <i>interface-set-name</i> {<br/>  interface <i>ethernet-interface-name</i> {<br/>    (unit <i>unit-number</i>   <i>vlan-tags-outer</i> <i>vlan-tag</i>);<br/>  }<br/>}</pre>                                    |
| <b>Hierarchy Level</b>          | [edit interfaces]                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                      |
| <b>Description</b>              | <p>The set of interfaces used to configure hierarchical CoS schedulers on Ethernet interfaces on the MX Series router and IQ2E PIC on M Series and T Series routers.</p> <p>The remaining statements are described separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">interface-set (Hierarchical Schedulers)</a></li></ul>                                                                                                                          |

## interface-set (IP Demux Interfaces)

|                                 |                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>interface-set <i>interface-set-name</i> {   interface <i>interface-name</i> {     unit <i>unit-number</i>;   } }</pre>                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces]                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                        |
| <b>Description</b>              | <p>The set of interfaces used to configure hierarchical CoS schedulers for subscribers on IP demux interfaces on the MX Series router.</p> <p>The remaining statements are described separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos Subscriber Access Configuration Guide</i></li> <li>• <i>Interfaces Fundamentals for Routing Devices</i></li> </ul>                                 |

## interface-shared-with

|                                 |                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interface-shared-with <i>psdn</i> ;                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>ge-fpc/pic/slot</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces <i>so-fpc/pic/slot</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces <i>xe-fpc/pic/slot</i> unit <i>logical-unit-number</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                                                                                                               |
| <b>Description</b>              | Assign a logical interface under a shared physical interface to a Protected System Domain (PSD).                                                                                                                                                  |
| <b>Options</b>                  | <p><i>n</i>—PSD identification as a numeric value.</p> <p><b>Range:</b> 1 through 31</p>                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>view-level—To view this statement in the configuration.</p> <p>control-level—To add this statement to the configuration.</p>                                                                                                                   |
| <b>Related Documentation</b>    |                                                                                                                                                                                                                                                   |

## interface-status-tlv

---

|                                 |                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interface-status-tlv [ down lower-layer-down ];                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet</b> connectivity-fault-management <b>action-profile</b> <i>profile-name</i> event]                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Defines an <b>action-profile</b> consisting of various events and the action. Based on values of <b>interface-status-tlv</b> in the received CCM packets, specific action such as <i>interface-down</i> can be taken using <b>action-profile</b> options.                                                                         |
| <b>Options</b>                  | <p><b>down</b>—When the incoming CCM packet contains interface status TLV with value down, the action will be triggered for this action-profile.</p> <p><b>lower-layer-down</b>—When the incoming CCM packet contains interface status TLV with value lower-layer-down, the action will be triggered for this action-profile.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Remote MEP Action Profile Support</i></li></ul>                                                                                                                                                                                                                            |

## interface-switch

---

|                                 |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>interface-switch <i>connection-name</i> {     interface <i>interface-name.unit-number</i>; }</pre>                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols connections],<br>[edit protocols connections]                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Configure Layer 2 switching cross-connects. The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first.</p> <p>For Layer 2 switching cross-connects to work, you must also configure MPLS.</p> |
| <b>Options</b>                  | <p><b><i>connection-name</i></b>—Connection name (up to 128 characters in Junos 12.3 and later).</p> <p><b><i>interface interface-name.unit-number</i></b>—Interface name. Include the logical portion of the name, which corresponds to the logical unit number.</p>                                                                    |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration</p>                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the CCC Connection for Layer 2 Switching Cross-Connects</i></li> <li>• <a href="#">Defining the Connection for Switching Cross-Connects on page 253</a></li> <li>• <i>MPLS Applications Feature Guide for Routing Devices</i></li> </ul>                                         |

## interface-type (Interfaces)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>interface-type (bc   coc1   ct1   ct3   dc   ds   so   t1   t3);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>     | <p>[edit interfaces <i>interface-range</i> name <b>no-partition</b>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>         | For IQ and IQE interfaces only, configure the sublevel interface type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>             | <p><b>bc</b>—Dual—Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>] hierarchy level to create a bearer (B) channel <b>bc-pim/0/port:channel</b> interface for each time you want to function as an ISDN PRI B-channel.</p> <p><b>coc1</b>—Channelized OC1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc12-fpc/pic/port</b>] hierarchy level.</p> <p><b>ct1</b>—Channelized T1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type <b>ct3-fpc/pic/port&lt;:channel&gt;</b>] hierarchy level.</p> <p><b>ct3</b>—Channelized T3 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc1-fpc/pic/port:channel no-partition</b>] hierarchy level.</p> <p><b>dc</b>—Dual-Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>] hierarchy level to create a (D) channel <b>dc-pim/0/port</b> to control the B-channels.</p> <p><b>ds</b>—DS0 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type (<b>ce1-fpc/pic/port</b>   <b>ct1-fpc/pic/port&lt;:channel&gt;</b>)] hierarchy level.</p> <p><b>so</b>—SONET/SDH interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc12-fpc/pic/port</b>] hierarchy level.</p> <p><b>t1</b>—T1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type (<b>coc12-fpc/pic/port</b>   <b>coc1-fpc/pic/port</b>)] hierarchy level.</p> <p><b>t3</b>—T3 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type (<b>coc12-fpc/pic/port</b>   <b>coc1-fpc/pic/port:channel no-partition</b>)] hierarchy level.</p> |



**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- *Channelized E1 IQ and IQE Interfaces Overview*
- *Channelized OC12/STM4 IQ and IQE Interfaces Overview*
- *Configuring Channelized T3 IQ Interfaces*

## interfaces

**Syntax** interfaces { ... }

**Hierarchy Level** [edit]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure interfaces on the router.

**Default** The management and internal Ethernet interfaces are automatically configured. You must configure all other interfaces.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- [Physical Interface Configuration Statements Overview on page 58](#)
- *Configuring Aggregated Ethernet Link Protection*

## interfaces (Static and Dynamic Subscribers)

```
Syntax interfaces {
 interface-name {
 unit logical-unit-number {
 auto-configure {
 agent-circuit-identifier {
 dynamic-profile profile-name;
 }
 }
 }
 family family {
 access-concentrator name;
 address address;
 direct-connect;
 duplicate-protection;
 dynamic-profile profile-name;
 filter {
 adf {
 counter;
 input-precedence precedence;
 not-mandatory;
 output-precedence precedence;
 rule rule-value;
 }
 input filter-name {
 shared-name filter-shared-name;
 }
 output filter-name {
 shared-name filter-shared-name;
 }
 }
 max-sessions number;
 max-sessions-vsa-ignore;
 rpf-check {
 mode loose;
 }
 service {
 input {
 service-set service-set-name {
 service-filter filter-name;
 }
 post-service-filter filter-name;
 }
 output {
 service-set service-set-name {
 service-filter filter-name;
 }
 }
 }
 }
 service-name-table table-name
 short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
 maximum-seconds>;
 unnumbered-address interface-name <preferred-source-address address>;
 }
}
```

```

filter {
 input filter-name (
 precedence precedence;
 shared-name filter-shared-name;
)
 output filter-name {
 precedence precedence;
 shared-name filter-shared-name;
 }
}
ppp-options {
 chap;
 pap;
}
proxy-arp;
vlan-id;
vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
}
vlan-tagging;
}
interface-set interface-set-name {
 interface interface-name {
 unit logical unit number {
 advisory-options {
 downstream-rate rate;
 upstream-rate rate;
 }
 }
 }
}
pppoe-underlying-options {
 max-sessions number;
}
}
demux0 {
 unit logical-unit-number {
 demux-options {
 underlying-interface interface-name
 }
 }
 family family {
 access-concentrator name;
 address address;
 direct-connect;
 duplicate-protection;
 dynamic-profile profile-name;
 demux-source {
 source-prefix;
 }
 }
 filter {
 input filter-name (
 precedence precedence;
 shared-name filter-shared-name;
)
 output filter-name {
 precedence precedence;
 shared-name filter-shared-name;
 }
 }
}

```

```

 }
 mac-validate (loose | strict):
 max-sessions number;
 max-sessions-vsa-ignore;
 rpf-check {
 fail-filter filter-name;
 mode loose;
 }
 service-name-table table-name
 short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
 maximum-seconds>;
 unnumbered-address interface-name <preferred-source-address address>;
}
filter {
 input filter-name;
 output filter-name;
}
vlan-id number;
vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
}
}
pp0 {
 unit logical-unit-number {
 keepalives interval seconds;
 no-keepalives;
 pppoe-options {
 underlying-interface interface-name;
 server;
 }
 ppp-options {
 authentication [authentication-protocols];
 chap {
 challenge-length minimum minimum-length maximum maximum-length;
 }
 pap;
 }
 }
 family inet {
 unnumbered-address interface-name;
 address address;
 service {
 input {
 service-set service-set-name {
 service-filter filter-name;
 }
 post-service-filter filter-name;
 }
 output {
 service-set service-set-name {
 service-filter filter-name;
 }
 }
 }
 }
}
filter {
 input filter-name {
 precedence precedence;
 shared-name filter-shared-name;
 }
}

```

```

 }
 output filter-name {
 precedence precedence;
 shared-name filter-shared-name;
 }
}
}
}
}
}
}
}

```

**Hierarchy Level** [edit [dynamic-profiles](#) *profile-name*]

**Release Information** Statement introduced in Junos OS Release 9.2.

**Description** Define interfaces for dynamic profiles.

**Options** *interface-name*—The interface variable (`$junos-interface-ifd-name`). The interface variable is dynamically replaced with the interface the DHCP client accesses when connecting to the router.



**NOTE:** Though we do not recommend it, you can also enter the specific name of the interface you want to assign to the dynamic profile.

The remaining statements are explained separately.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
- *Configuring Dynamic PPPoE Subscriber Interfaces*
- *Configuring Dynamic VLANs Based on Agent Circuit Identifier Information*
- *DHCP Subscriber Interface Overview*
- *Configuring Subscribers over Static Interfaces*
- [Demultiplexing Interface Overview on page 273](#)

## interleave-fragments

---

|                                 |                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interleave-fragments;                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                            |
| <b>Description</b>              | For link services interfaces only, interleave long packets with high-priority packets.<br><br>Allows small delay-sensitive packets, such as Voice over IP (VoIP) packets, to interleave with long fragmented packets. This minimizes the latency of delay-sensitive packets. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                            |

## interval

---

|                                 |                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | interval (100ms   10m   10ms   10s   1m   1s);                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <b>continuity-check</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Ten milliseconds option introduced in Junos OS Release 9.1.                                                      |
| <b>Description</b>              | The time between continuity check messages.                                                                                                                       |
| <b>Options</b>                  | 100ms—100 milliseconds.<br><br>10m—10 minutes.<br><br>10ms—10 milliseconds.<br><br>10s—10 seconds.<br><br>1m—1 minute.<br><br>1s—1 second.                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Continuity Check Protocol Parameters for Fault Detection</i></li></ul>                                     |

## inverse-arp

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | inverse-arp;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> multipoint-destination <i>destination</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet <b>address</b> <i>address</i> multipoint-destination <i>destination</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | For ATM encapsulation, enable responses to receive inverse ATM ARP requests. For Frame Relay encapsulation, enable responses to receive inverse Frame Relay ARP requests.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>                  | Inverse ARP is disabled on all ATM and Frame Relay interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Inverse ATM1 or ATM2 ARP</i></li> <li>• <i>Configuring Inverse Frame Relay ARP</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## invert-data

---

|                            |                                                                                                                                                                                                                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | invert-data;                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> e3-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                        |
| <b>Description</b>         | Invert the transmission of unused data bits on the DS0, E1, E3, and T1 interface.                                                                                                                                                                                                                                      |



**NOTE:** When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the invert-data statement must be included at the [edit interfaces e1-*fpc/pic/port*] or [edit interfaces t1-*fpc/pic/port*] hierarchy level as appropriate.

---

|                                 |                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E1 Data Inversion</i></li><li>• <i>Configuring E3 Data Inversion</i></li><li>• <i>Configuring T1 Data Inversion</i></li></ul> |



## ipsec-sa

|                                 |                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ipsec-sa sa-name;</code>                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces es-fpc/pic/port <b>unit</b> logical-unit-number <b>family</b> inet],<br>[edit logical-systems logical-system-name interfaces es-fpc/pic/port <b>unit</b> logical-unit-number <b>family</b> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                 |
| <b>Description</b>              | Specify the IP Security (IPsec) security association (SA) name associated with the interface.                                                                                                                     |
| <b>Options</b>                  | <b>sa-name</b> —IPsec security association name.                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                         |

## iteration-count

|                                 |                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>iteration-count count-value;</code>                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name mep mep-id remote-mep remote-mep-id sla-iterator-profile profile-name]                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                   |
| <b>Description</b>              | Configure the number of iterations for which the connection partakes in the iterator for acquiring SLA measurements.                                                                                             |
| <b>Options</b>                  | <b>count-value</b> —Number of iterations for which the connection should partake in the iterator for acquiring SLA measurements.<br><b>Range:</b> 1 through 65,535<br><b>Default:</b> 0 (or infinite iterations) |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">sla-iterator-profile on page 847</a></li> <li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li> </ul>                                         |

## iteration-period

---

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>iteration-period <i>iteration-period-value</i>;</code>                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> <a href="#">sla-iterator-profiles</a> <i>profile-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                                                                                       |
| <b>Description</b>              | Configure the iteration period, which is the maximum number of cycles per iteration (that is, the number of connections registered to an iterator cannot exceed this value).                                  |
| <b>Options</b>                  | <i>iteration-period-value</i> —Maximum number of cycles per iteration.<br><b>Range:</b> 1 through 2000<br><b>Default:</b> 2000                                                                                |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an Iterator Profile</a></li><li>• <a href="#">Configuring an Iterator Profile on a Switch (CLI Procedure)</a></li></ul>                       |

## keep-address-and-control

---

|                                 |                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>keep-address-and-control;</code>                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                    |
| <b>Description</b>              | For interfaces with encapsulation type PPP CCC, do not remove the address and control bytes before encapsulating the packet into a tunnel.                                                                                                                                                           |
| <b>Default</b>                  | If you do not include this statement, address and control bytes are removed before encapsulating the packet into a tunnel.                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Disabling the Removal of Address and Control Bytes on page 202</a></li></ul>                                                                                                                                                                     |

## keepalives

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>keepalives &lt;interval seconds&gt; &lt;down-count number&gt; &lt;up-count number&gt;;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>]</p>                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Enable the sending of keepalives on a physical interface configured with PPP, Frame Relay, or Cisco HDLC encapsulation.</p> <p>For ATM2 IQ interfaces only, you can enable keepalives on a logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul>                                                                                        |
| <b>Default</b>                  | Sending of keepalives is enabled by default. The default keepalive interval is 10 seconds for PPP, Frame Relay, or Cisco HDLC. The default down-count is 3 and the default up-count is 1 for PPP or Cisco HDLC.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>down-count <i>number</i></b>—The number of keepalive packets a destination must fail to receive before the network takes down a link.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 3</p> <p><b>interval <i>seconds</i></b>—The time in seconds between successive keepalive requests.</p> <p><b>Range:</b> 1 through 32767 seconds</p> <p><b>Default:</b> 10 seconds</p> <p><b>up-count <i>number</i></b>—The number of keepalive packets a destination must receive to change a link's status from down to up.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 1</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Keepalives on page 121</a></li> <li>• <i>Configuring Frame Relay Keepalives</i></li> <li>• <i>Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface</i></li> </ul>                                                                                                                                                                                                                                                                                                                                         |

## key

---

|                                 |                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>key number;</code>                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                          |
| <b>Description</b>              | For Adaptive Services PICs on M Series routers (except the M320 and M120 routers), identify an individual traffic flow within a tunnel, as defined in RFC 2890, <i>Key and Sequence Number Extensions to GRE</i> .                         |
| <b>Options</b>                  | <b>number</b> —Value of the key.<br><b>Range:</b> 0 through 4,294,967,295                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                          |

## l2tp-interface-id

---

|                                 |                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>l2tp-interface-id name;</code><br>(dedicated   shared);                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces sp- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> <b>interface</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces sp- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> <b>interface</b> ]       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                          |
| <b>Description</b>              | Specify the L2TP options for configuring logical interfaces for group and user sessions.                                                                                                                                                                   |
| <b>Options</b>                  | (dedicated   shared)—Specifies whether a logical interface can host one (dedicated) or multiple (shared) sessions at one time.<br><br><b>name</b> —Interface identifier that must be replicated at the [edit access profile <i>name</i> ] hierarchy level. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                          |

## lACP (Protocols)


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>lACP {   traceoptions {     file &lt;filename&gt; &lt;files number&gt; &lt;size size&gt; &lt;world-readable   no-world-readable&gt;;     flag flag;     no-remote-trace;   }   fast-hello-issu;   ppm (Ethernet Switching) centralized; }</pre>                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit protocols]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.3.</p> <p>The <b>ppm centralized</b> option introduced in Junos OS Release 9.4.</p> <p>The <b>fast-hello-issu</b> option introduced in Junos OS Release 14.1.</p>                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>On MX and T Series routers, you can specify periodic packet management (PPM) as centralized. By default, the PPM is distributed.</p> <p>MX Series routers support Link Aggregation Control Protocol (LACP) with fast hellos during unified ISSU. This support is disabled by default. You must enable the <b>fast-hello-issu</b> option on the main router and on the peer routers before starting unified ISSU. Note that the peer router must also be an MX Series router for this functionality to work.</p> |
| <b>Default</b>                  | Distributed PPM processing is enabled for all packets that use PPM.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>ppm</b>—Set PPM to centralized.</p> <p><b>fast-hello-issu</b>—Enable LACP with fast hellos during unified ISSU.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Tracing LACP Operations</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## lacp (802.3ad)

---

|                                 |                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>lacp {<br/>    port-priority <i>port-priority</i><br/>}</code>                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> fastether-options <a href="#">802.3ad</a> ],<br>[edit interfaces <i>interface-name</i> gigether-options <a href="#">802.3ad</a> ]                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                 |
| <b>Description</b>              | Configure the Link Aggregation Control Protocol (LACP) port priority for Ethernet interfaces.                                                                                                                                 |
| <b>Options</b>                  | <i>port-priority</i> —Priority for being elected as the active port to collect and distribute traffic.<br>A smaller value indicates a higher priority for selection.<br><b>Range:</b> 0 through 65,535<br><b>Default:</b> 127 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring LACP for Aggregated Ethernet Interfaces</i></li><li>• <a href="#">port-priority on page 779</a></li></ul>                                                              |

## lACP (Aggregated Ethernet)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>lACP {   (active   passive);   admin-key key;   accept-data;   fast-failover;   link-protection {     disable;     (revertive   non-revertive);   }   periodic interval;   system-id mac-address;   system-priority priority; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>     | <p>[edit interfaces aeX <b>aggregated-ether-options</b>]</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces aeX aggregated-ether-options]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>fast-failover</b> option introduced in Junos OS Release 12.2.</p> <p>Support for logical systems introduced in Junos OS Release 14.1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>         | <p>Configure the Link Aggregation Control Protocol (LACP) for aggregated Ethernet interfaces only.</p> <p>When you configure the <b>accept-data</b> statement at the [edit interfaces aeX <b>aggregated-ether-options lACP</b>] hierarchy level, the router processes packets received on a member link irrespective of the LACP state if the aggregated Ethernet bundle is up.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> <b>NOTE:</b> When you configure the <b>accept-data</b> statement at the [edit interfaces aeX aggregated-ether-options lACP] hierarchy level, this behavior occurs:</p> <ul style="list-style-type: none"> <li>• By default, the <b>accept-data</b> statement is not configured when LACP is enabled.</li> <li>• You can configure the <b>accept-data</b> statement to improve convergence and reduce the number of dropped packets when member links in the bundle are enabled or disabled.</li> <li>• When LACP is down and a member link receives packets, the router or switch does not process packets as defined in the IEEE 802.1ax standard. According to this standard, the packets should be dropped, but they are processed instead because the <b>accept-data</b> statement is configured.</li> </ul> </div> |
| <b>Default</b>             | If you do not specify LACP as either <b>active</b> or <b>passive</b> , LACP remains passive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>             | <b>active</b> —Initiate transmission of LACP packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**admin-key *number***—Specify an administrative key for the router or switch.



**NOTE:** You must also configure multichassis link aggregation (MC-LAG) when you configure the **admin-key**.

**fast-failover**—Specify to override the IEEE 802.3ad standard and allow the standby link to receive traffic. Overriding the default behavior facilitates subsecond failover.

**passive**—Respond to LACP packets.

The remaining statements are explained separately.

|                                 |                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.                                                         |
|                                 | interface-control—To add this statement to the configuration.                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring LACP for Aggregated Ethernet Interfaces</i></li> </ul> |



## layer2-policer

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> layer2-policer {     input-policer policer-name;     input-three-color policer-name;     output-policer policer-name;     output-three-color policer-name; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.2.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series, MX Series, and T Series routers, and for aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces on EX Series switches, apply Layer 2 logical interface policers. The following policers are supported:</p> <ul style="list-style-type: none"> <li>• Two-color</li> <li>• Single-rate tricolor marking (srTCM)</li> <li>• Two-rate tricolor marking (trTCM)</li> </ul> <p>Two-color and tricolor policers are configured at the <b>[edit firewall]</b> hierarchy level.</p>                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>input-policer <i>policer-name</i></b>—Two-color input policer to associate with the interface. This statement is mutually exclusive with the <b>input-three-color</b> statement.</p> <p><b>input-three-color <i>policer-name</i></b>—Tricolor input policer to associate with the interface. This statement is mutually exclusive with the <b>input-policer</b> statement.</p> <p><b>output-policer <i>policer-name</i></b>—Two-color output policer to associate with the interface. This statement is mutually exclusive with the <b>output-three-color</b> statement.</p> <p><b>output-three-color <i>policer-name</i></b>—Tricolor output policer to associate with the interface. This statement is mutually exclusive with the <b>output-policer</b> statement.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li> <li>• <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## **lcp-max-conf-req**

---

|                                 |                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>lcp-max-conf-req <i>number</i></code>                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>so-fpc/pic/port unit number ppp-options</i> ]                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                                                                                                                          |
| <b>Description</b>              | Set the maximum number of LCP Configure-Requests to be sent, after which the router goes to LCP down state.                                                                                                            |
| <b>Options</b>                  | <i>number</i> —From 0 to 65,535, where 0 means send infinite LCP Configure-Requests, and any other value specifies the maximum number LCP Configure-Requests to send and then stop sending.<br><br><i>Default</i> —254 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the LCP Configure-Request Maximum Sent on page 174</a></li><li>• <a href="#">ppp-options on page 781</a></li></ul>                                     |

## **lcp-restart-timer**

---

|                                 |                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>lcp-restart-timer <i>milliseconds</i>;</code>                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name unit logical-unit-number ppp-options</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name unit logical-unit-number ppp-options</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.                                                                                                                                                              |
| <b>Description</b>              | For interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations, configure a restart timer for the Link Control Protocol (LCP) component of a PPP session.      |
| <b>Options</b>                  | <i>milliseconds</i> —The time, in milliseconds, between successive LCP configuration requests.<br><b>Range:</b> 20 through 10000 milliseconds<br><b>Default:</b> 3 seconds                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Restart Timers on page 173</a></li></ul>                                                                                           |

## level

---

|                                 |                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>level <i>number</i>;</code>                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> <i>domain-name</i> ]                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in junos os release 12.1X48 for PTX Series Packet Transport Routers.                                                    |
| <b>Description</b>              | A number used in CFM messages to identify the maintenance association.                                                                                                                        |
| <b>Options</b>                  | <b><i>number</i></b> —A number used to identify the maintenance domain to which the CFM message belongs.<br><b>Range:</b> 0 through 7                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Maintenance Domain Level</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |

## line-encoding

---

|                            |                                                                                                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | line-encoding (ami   b8zs);                                                                                                                     |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]                                       |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. |
| <b>Description</b>         | Set the line encoding format on the T1 interface.                                                                                               |



**NOTE:** When configuring CT1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the **line-encoding** statement must be included at the [edit interfaces *ct1-fpc/pic/port*] hierarchy level.

|                                 |                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | The default line encoding is B8ZS.                                                                                                        |
| <b>Options</b>                  | <b>ami</b> —Use Alternate Mark Inversion (AMI) line encoding.<br><b>b8zs</b> —Use bipolar with 8-zeros substitution (B8ZS) line encoding. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring T1 Line Encoding</i></li></ul>                                                     |

---

## line-protocol

---

|                                 |                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>line-protocol <i>protocol</i>;</code>                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                        |
| <b>Description</b>              | For serial interfaces only, configure the line protocol.                                                                                                                                                                                                 |
| <b>Options</b>                  | <b><i>protocol</i></b> —You can specify the one of the following line protocols: <ul style="list-style-type: none"><li>• <b>eia530</b>—Line protocol EIA-530</li><li>• <b>v.35</b>—Line protocol V.35</li><li>• <b>x.21</b>—Line protocol X.21</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Line Protocol on page 296</a></li></ul>                                                                                                                                       |

## linear-red-profile

---

|                                 |                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>linear-red-profile <i>profile-name</i>;</code>                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                    |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign a linear RED profile to a specified forwarding class. To define the linear RED profiles, include the <a href="#">linear-red-profiles</a> statement at the [edit interfaces at- <i>fpc/pic/port</i> atm-options] hierarchy level. |
| <b>Default</b>                  | If you do not include either the <b>epd-threshold</b> or the <b>linear-red-profile</b> statement in the forwarding class configuration, the Junos OS uses an EPD threshold based on the available bandwidth and other parameters.                                    |
| <b>Options</b>                  | <i>profile-name</i> —Name of the linear RED profile.                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ATM Scheduler Map</i></li><li>• <a href="#">linear-red-profiles on page 637</a></li><li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li><li>• <i>epd-threshold</i></li></ul>                     |

## linear-red-profiles

|                                 |                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>linear-red-profiles <i>profile-name</i> {<br/>    high-plp-threshold <i>percent</i>;<br/>    low-plp-threshold <i>percent</i>;<br/>    queue-depth <i>cells</i>;<br/>}</code>                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>at-fpc/pic/port</i> <a href="#">atm-options</a> ]                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                     |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS virtual circuit drop profiles for RED. When a packet arrives, RED checks the queue fill level. If the fill level corresponds to a nonzero drop probability, the RED algorithm determines whether to drop the arriving packet. |
| <b>Options</b>                  | <i>profile-name</i> —Name of the drop profile.<br><br>The statements are explained separately.                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li> </ul>                                                                                              |

## link-adjacency-loss

|                                 |                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>link-adjacency-loss;</code>                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> ]                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                     |
| <b>Description</b>              | Loss of adjacency with IEEE 802.3ah link-fault management peer event. When included, the loss-of-adjacency event triggers the action specified under the <b>action</b> statement. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Monitoring the Loss of Link Adjacency</i></li> </ul>                                                                                  |

## link-discovery

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-discovery (active   passive);                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches, and M320, M120, MX Series, and T Series routers, specify the discovery mode used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. The discovery process is triggered automatically when OAM 802.3ah functionality is enabled on a port. Link monitoring is done when the interface sends periodic OAM PDUs. |
| <b>Options</b>                  | (active   passive)—Passive or active mode. In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. Once the discovery process is initiated, both sides participate in discovery.                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Link Discovery</i></li></ul>                                                                                                                                                                                                                                                                                                 |

## link-down

---

|                                 |                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-down;                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> ]                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                |
| <b>Description</b>              | Mark the interface down for transit traffic.                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul> |



---

## link-event-rate

---

|                                 |                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>link-event-rate {<br/>    frame-error count;<br/>    frame-period count;<br/>    frame-period-summary count;<br/>    symbol-period count;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> ]                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                              |
| <b>Description</b>              | Configure the number of link-fault management events per second.                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li></ul>                                |

## link-fault-management

```
Syntax link-fault-management {
 action-profile profile-name {
 action {
 link-down;
 send-critical-event;
 syslog;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 protocol-down;
 }
 }
 }
 interface interface-name {
 apply-action-profile profile-name;
 link-discovery (active | passive);
 loopback-tracking;
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
 }
}
```

**Hierarchy Level** [edit protocols [oam](#) [ethernet](#)]

**Release Information** Statement introduced in Junos OS Release 8.2.

**Description** For Ethernet interfaces on M320, M120, MX Series, and T Series routers and EX Series switches, specify fault signaling and detection for IEEE 802.3ah Operation, Administration, and Management (OAM) support.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation** • *Enabling IEEE 802.3ah OAM Support*

## link-layer-overhead

---

|                                 |                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-layer-overhead <i>percent</i> ;                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                         |
| <b>Description</b>              | For AS PIC or MultiServices PIC link services IQ interfaces ( <b>lsq</b> ) only, configure the percentage of total bundle bandwidth to be set aside for link-layer overhead.                                                                                                              |
| <b>Options</b>                  | <b>percent</b> —Percentage of total bundle bandwidth to be set aside for link-layer overhead.<br><b>Range:</b> 0 through 50 percent<br><b>Default:</b> 4 percent                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                   |
| <b>Related Documentation</b>    | • <i>Junos OS Services Interfaces Library for Routing Devices</i>                                                                                                                                                                                                                         |

## link-mode

---

|                            |                                                                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>link-mode mode;</code>                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> ether-options],</code><br><code>[edit interfaces <i>ge-pim</i>/0/0 <i>switch-options</i> <i>switch-port</i> <i>port-number</i>]</code> |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                          |
| <b>Description</b>         | Set the device's link connection characteristic.                                                                                                                                                                                             |

**Options** *mode*—Link characteristics:

- **automatic**—Link mode is negotiated. This is the default for EX Series switches.
- **full-duplex**—Connection is full duplex.
- **half-duplex**—Connection is half duplex.

**Default:** Fast Ethernet interfaces, can operate in either full-duplex or half-duplex mode. The router's management Ethernet interface, **fxp0** or **em0**, and the built-in Fast Ethernet interfaces on the FIC (M7i router) autonegotiate whether to operate in full-duplex or half-duplex mode. Unless otherwise noted here, all other interfaces operate only in full-duplex mode.



**NOTE:**

- On EX4300 switches, the interfaces operate in full-duplex mode only.
  - On EX Series switches, if **no-auto-negotiation** is specified in `[edit interfaces interface-name ether-options]`, you can select only **full-duplex** or **half-duplex**. If **auto-negotiation** is specified, you can select any mode.
- 



**NOTE:** Member links of an aggregated Ethernet bundle must not be explicitly configured with a link mode. You must remove any such link-mode configuration before committing the aggregated Ethernet configuration.

---

|                                 |                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Link Characteristics on Ethernet Interfaces</i></li><li>• <a href="#">Understanding Management Ethernet Interfaces on page 10</a></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul> |

- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*

## link-protection

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>link-protection {   disable;   (revertive   non-revertive); }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit interfaces aex <b>aggregated-ether-options</b>]<br/> [edit interfaces aex aggregated-ether-options <i>lcp</i>]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.3.<br/> Statement introduced in Junos OS Release 9.0 for EX Series switches.<br/> Support for <b>disable</b>, <b>revertive</b>, and <b>non-revertive</b> statements added in Junos OS Release 9.3.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>On the router, for aggregated Ethernet interfaces only, configure link protection. In addition to enabling link protection, a primary and a secondary (backup) link must be configured to specify what links egress traffic should traverse. To configure primary and secondary links on the router, include the <b>primary</b> and <b>backup</b> statements at the [edit interfaces <i>ge-fpc/pic/port</i> <b>gigether-options 802.3ad aex</b>] hierarchy level or the [edit interfaces <i>fe-fpc/pic/port</i> <b>fastether-options 802.3ad aex</b>] hierarchy level.</p> <p>On the switch, you can configure either Junos OS link protection for aggregated Ethernet interfaces or the LACP standards link protection for aggregated Ethernet interfaces.</p> <p>For Junos OS link protection, specify <b>link-protection</b> at the following hierarchy levels:</p> <ul style="list-style-type: none"> <li>• [edit interfaces <i>ge-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>]</li> <li>• [edit interfaces <i>xe-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>] hierarchy level or at the [edit interfaces <i>xe-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>] hierarchy level.</li> </ul> <p>To disable link protection, use the <b>delete interface ae aggregate-ether-options link-protection</b> statement at the [edit interfaces aex <b>aggregated-ether-options</b>] hierarchy level or the [edit interfaces aex aggregated-ether-options <i>lcp</i>] hierarchy level.</p> |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.<br/> interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Aggregated Ethernet Link Protection</i></li> <li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## link-speed (Aggregated Ethernet)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>link-speed <i>speed</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | [edit interfaces aex <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> aggregated-ether-options],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-sonet-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br><b>mixed</b> option added in Junos OS Release 15.1F3 for PTX Series routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>         | For aggregated Ethernet interfaces only, set the required link speed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>             | <p><b><i>speed</i></b>—For aggregated Ethernet links, you can specify <b><i>speed</i></b> in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p>Aggregated Ethernet links on the M120 router can have one of the following speeds:</p> <ul style="list-style-type: none"><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>oc192</b>—Links are OC192 or STM64c.</li></ul> <p>Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speeds:</p> <ul style="list-style-type: none"><li>• <b>10m</b>—Links are 10 Mbps.</li><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li></ul> <p>Aggregated Ethernet links on T Series routers can be configured to operate at one of the following speeds:</p> <ul style="list-style-type: none"><li>• <b>100g</b>—Links are 100 Gbps.</li><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>40g</b>—Links are 40 Gbps.</li><li>• <b>50g</b>—Links are 50 Gbps.</li><li>• <b>80g</b>—Links are 80 Gbps.</li><li>• <b>8g</b>—Links are 8 Gbps.</li></ul> |

- **mixed**—Links are of various speeds.
- **oc192**—Links are OC192.

**mixed**—Enables bundling of different Ethernet rate links in the same Aggregated Ethernet interface on PTX Series routers.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Aggregated Ethernet Interfaces Overview</i></li><li>• <a href="#">Configuring Aggregated Ethernet Link Speed on page 106</a></li><li>• <i>Configuring Mixed Rates and Mixed Modes on Aggregated Ethernet Bundles</i></li><li>• <i>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li><li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li></ul> |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## link-speed (Aggregated SONET/SDH)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-speed ( <i>speed</i>   mixed);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces asx aggregated-sonet-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>mixed option added in Release 8.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | For aggregated SONET/SDH interfaces only, set the required link speed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>speed</b>—Aggregated SONET/SDH links can have one of the following speed values.</p> <ul style="list-style-type: none"><li>• <b>oc3</b>—Links are OC3c or STM1c.</li><li>• <b>oc12</b>—Links are OC12c or STM4c.</li><li>• <b>oc48</b>—Links are OC48c or STM16c.</li><li>• <b>oc192</b>—Links are OC192c or STM64c.</li><li>• <b>oc768</b>—Links are OC768c or STM256c.</li></ul> <p><b>mixed</b>—For aggregated SONET/SDH links on T Series routers, you can mix interface speeds in SONET/SDH aggregation bundles. Interface speeds from OC3 through OC768 are supported.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Aggregated Ethernet Link Speed on page 106</a></li><li>• <i>Configuring Aggregated SONET/SDH Interfaces</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  |



---

## linktrace

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>linktrace {<br/>    age (30m   10m   1m   30s   10s);<br/>    path-database-size path-database-size;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management</a> ]                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                           |
| <b>Description</b>              | Configure connectivity fault management linktrace parameters.                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Linktrace Protocol in CFM</i></li></ul>                          |

## lmi (Frame Relay)

---

**Syntax**    lmi {  
              **lmi-type** (ansi | itu | c-lmi);  
              n391dte *number*;  
              n392dce *seconds*;  
              n392dte *number*;  
              n393dce *number*;  
              n393dte *number*;  
              t391dte *number*;  
              t392dce *seconds*;  
              }

**Hierarchy Level**    [edit interfaces *interface-name*]

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Set Frame Relay keepalive parameters.

**Options**    n391dte—DTE full status polling interval.

**Range:** 1 through 255

**Default:** 6

n392dce—DCE error threshold, in number of errors.

**Range:** 1 through 10

**Default:** 3

n392dte—DTE error threshold, in number of errors.

**Range:** 1 through 10

**Default:** 3

n393dce—DCE monitored event-count.

**Range:** 1 through 10

**Default:** 4

n393dte—DTE monitored event-count.

**Range:** 1 through 10

**Default:** 4

t391dte—DTE polling timer.

**Range:** 5 through 30 seconds

**Default:** 10 seconds

t392dce—DCE polling timer.

**Range:** 5 through 30 seconds

**Default:** 15 seconds

The remaining statements are explained separately.

|                              |                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege</b>    | interface—To view this statement in the configuration.                                                                                                                                                                       |
| <b>Level</b>                 | interface-control—To add this statement to the configuration.                                                                                                                                                                |
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Configuring Tunable Keepalives for Frame Relay LMI</i></li><li>• <a href="#">lmi-type on page 651</a></li><li>• <a href="#">mlfr-uni-nni-bundle-options on page 682</a></li></ul> |

## lmi (Ethernet OAM)

**Syntax**

```
lmi {
 status-counter count;
 polling-verification-timer value;
 interface name {
 uni-id uni-name;
 status-counter number;
 polling-verification-timer value;
 evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
 evc evc-name {
 default-evc;
 vlan-list vlan-id-list;
 }
 }
}
```

**Hierarchy Level** [edit protocols [oam](#) [ethernet](#)]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** On routers with **ge**, **xe**, or **ae** interfaces, configure an OAM Ethernet Local Management Interface (E-LMI).



**NOTE:** On MX Series routers, E-LMI is supported on Gigabit Ethernet (**ge**), 10-Gigabit Ethernet (**xe**), and Aggregated Ethernet (**ae**) interfaces configured on MX Series routers with DPC only.

**Options**

- status-counter *count***—Status counter (N393), defaults to 4.
- interface *name***—Polling verification timer (T392), defaults to 15 seconds.
- uni-id *uni-name***—(Optional) Defaults to the physical interface name.
- status-counter *number***—(Optional) Defaults to a global value.
- polling-verification-timer *value***—(Optional) Defaults to a global value.
- evc-map-type (*all-to-one-bundling* | *bundling* | *service-multiplexing*)**—Specify the Ethernet virtual connection (EVC) map type.
- evc *evc-name***—Specify the name of the EVC.
- default-evc**—Set the specified EVC as the default EVC.
- vlan-list *vlan-id-list***—Specify a group of VLANs to assign to the EVC.

**Required Privilege Level**

- interface**—To view this statement in the configuration.
- interface-control**—To add this statement to the configuration.

- Related Documentation**
- *Configuring Ethernet Local Management Interface*
  - [evcs on page 540](#)

## lmi-type


|                            |                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | lmi-type (ansi   itu   c-lmi);                                                                                                      |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>lmi</b> ],<br>[edit interfaces <i>interface-name</i> <b>mlfr-uni-nni-bundle-options</b> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                   |
| <b>Description</b>         | Set Frame Relay Local Management Interface (LMI) type.                                                                              |



**NOTE:** Consortium LMI is supported on all MPCs and I-chip based FPCs.

|                                 |                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <p><b>ansi</b>—Use ANSI T1.617 Annex D LMIs.</p> <p><b>itu</b>—Use ITU Q933 Annex A LMIs.</p> <p><b>c-lmi</b>—Use Consortium LMI.</p> <p><b>Default:</b> ansi</p>                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Frame Relay Keepalives</i></li> <li>• <a href="#">mlfr-uni-nni-bundle-options on page 682</a></li> <li>• <a href="#">lmi (Frame Relay) on page 648</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## local-name

|                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                               | <code>local-name <i>name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>                                                                                                                                                      | <p>[edit interfaces <i>interface-name</i> ppp-options chap],<br/>         [edit interfaces <i>interface-name</i> <b>ppp-options pap</b>],<br/>         [edit interfaces <i>interface-name</i> <b>unit logical-unit-number</b> ppp-options chap],<br/>         [edit interfaces <i>interface-name</i> <b>unit logical-unit-number ppp-options pap</b>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit logical-unit-number</b> ppp-options chap],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit logical-unit-number ppp-options pap</b>]<br/>         [edit dynamic-profiles <i>profile-name</i> interfaces pp0 unit "\$junos-interface-unit" ppp-options],<br/>         [edit dynamic-profiles <i>profile-name</i> interfaces "\$junos-interface-ifd-name" unit "\$junos-interface-unit" ppp-options]</p> |
| <b>Release Information</b>                                                                                                                                                  | <p>Statement introduced before Junos OS Release 7.4.<br/>         Support for PAP added in Junos OS Release 8.3.<br/>         Support at the [edit dynamic-profiles <i>profile-name</i> interfaces "\$junos-interface-ifd-name" <b>unit "\$junos-interface-unit" ppp-options</b>] hierarchy level introduced in Junos OS Release 14.2.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                                                                                                                                                          | <p>For CHAP authentication, the value sent in CHAP challenge and response packets on a per interface basis. For PAP authentication, the local hostname for sending PAP authentication requests.</p> <p>For ATM2 IQ interfaces only, you can configure a CHAP local name on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul>                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>                                                                                                                                                              | For CHAP authentication, if you do not include the <b>local-name</b> statement in the configuration, the interface sends the router's system hostname in CHAP challenge and response packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <div>  <b>NOTE:</b> The <i>name</i> range is from 1 through 8 characters.         </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b>                                                                                                                                             | <p>interface—To view this statement in the configuration.<br/>         interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>                                                                                                                                                | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 123</a></li> <li>• <a href="#">Configuring the PPP Password Authentication Protocol On a Physical Interface on page 126</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## local-password

---

|                                 |                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>local-password password;</code>                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options pap</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options pap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options pap</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Configure the host password for sending PAP requests.                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Local Password on page 176</a></li> <li>• <a href="#">Configuring the PPP Password Authentication Protocol On a Physical Interface on page 126</a></li> </ul>                                                                                              |

## lockout

---

|                                 |                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>lockout;</code>                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                          |
| <b>Description</b>              | Configure a lockout of protection, forcing the use of the working circuit and locking out the protect circuit regardless of anything else. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Switching Between the Working and Protect Circuits</a></li> </ul>         |

## log-prefix (Interfaces)

---

|                                 |                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | log-prefix <i>prefix-value</i> ;                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options syslog <b>host</b> <i>hostname</i> ]                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                     |
| <b>Description</b>              | Set the system logging prefix value.                                                                                                                                                  |
| <b>Options</b>                  | <i>prefix-value</i> —System logging prefix value.                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Configuring System Logging for Services Interfaces</i></li></ul> |

## logical-interface-fpc-redundancy (Aggregated Ethernet Subscriber Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | logical-interface-fpc-redundancy;                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>aenumber</i> <b>aggregated-ether-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.<br>Statement introduced in Junos OS Release 13.2R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>Provide module redundancy for demux subscribers on aggregated Ethernet bundles configured with targeted distribution. Backup links for a subscriber are chosen on a different EQ DPC or MPC from the primary link, based on the link with the fewest number of subscribers among the links on different modules. If all links are on a single module when this is configured, backup links are not provisioned.</p> <p>By default, link redundancy is provided for the aggregated Ethernet bundle.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Link and Module Redundancy for Demux Subscribers in an Aggregated Ethernet Interface</i></li><li>• <i>Configuring Module Redundancy for a Virtual Chassis</i></li></ul>                                                                                                                                                                                                                                                                            |



## logical-interface-policer

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | logical-interface-policer;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>     | [edit <a href="#">dynamic-profiles</a> <i>profile-name</i> firewall policer <i>policer-name</i> ],<br>[edit <a href="#">dynamic-profiles</a> <i>profile-name</i> firewall three-color-policer <i>name</i> ],<br>[edit firewall atm-policer <i>atm-policer-name</i> ],<br>[edit firewall policer <i>policer-name</i> ],<br>[edit firewall policer <i>policer-template-name</i> ],<br>[edit firewall three-color-policer <i>policer-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> firewall policer <i>policer-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> firewall three-color-policer <i>name</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Support at the [edit firewall three-color-policer <i>policer-name</i> ] hierarchy level introduced in Junos OS Release 8.2.<br>Logical systems support introduced in Junos OS Release 9.3.<br>Support at the [edit <a href="#">dynamic-profiles</a> ... policer <i>policer-name</i> ] and [edit <a href="#">dynamic-profiles</a> ... three-color-policer <i>name</i> ] hierarchy levels introduced in Junos OS Release 11.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                             |
| <b>Description</b>         | Configure a logical interface policer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



**NOTE:** Starting in Junos OS Release 12.2R2, on T Series Core Routers only, you can configure an MPLS LSP policer for a specific LSP to be shared across different protocol family types. You must include the logical-interface-policer statement to do so.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Two-Color and Three-Color Logical Interface Policers</i></li> <li>• <i>Traffic Policer Types</i></li> <li>• <i>Configuring and Applying Tricolor Marking Policers</i></li> <li>• <i>action</i></li> <li>• <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i></li> <li>• <a href="#">action on page 393</a></li> </ul> |

## logical-systems

---

|                          |                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>logical-systems {<br/>    logical-system-name {<br/>        ...logical-system-configuration...<br/>    }<br/>}</pre>        |
| Hierarchy Level          | [edit]                                                                                                                           |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement name changed from <b>logical-routers</b> in Junos OS Release 9.3. |
| Description              | Configure a logical system.                                                                                                      |
| Options                  | <b>logical-system-name</b> —Name of the logical system.                                                                          |
| Required Privilege Level | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.              |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Logical Systems Feature Guide for Routing Devices</i></li></ul>                       |

## long-buildout

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | (long-buildout   no-long-buildout);                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                               |
| Release Information      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description              | <p>Configure the T3 line buildout. A T3 interface has two settings for the T3 line buildout: a short setting, which is less than 255 feet (68 meters), and a long setting, which is greater than 255 feet and shorter than 450 feet (137 meters).</p> <p>This statement applies to copper-cable-based T3 interfaces only. You cannot configure a line buildout for a DS3 channel on a channelized OC12 interface, which runs over fiber-optic cable.</p> |
| Default                  | A T3 interface uses the short line buildout setting ( <b>no-long-buildout</b> ) for wires shorter than 255 feet (68 meters).                                                                                                                                                                                                                                                                                                                             |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring the T3 Line Buildout</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                |

## loop-timing

|                            |                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (loop-timing   no-loop-timing);                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | [edit interfaces ct3- <i>fpc/pic/port</i> <b>t3-options</b> ],<br>[edit interfaces e1- <i>fpc/pic/port:0</i> <b>sonet-options</b> ],<br>[edit interfaces stm1- <i>fpc/pic/port</i> <b>sonet-options</b> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                                                                                         |
| <b>Description</b>         | For channelized IQ interfaces and non-IQ channelized STM1 interfaces only, configure the SONET/SDH or DS3-level clocking source.                                                                          |



**NOTE:** On M Series, MX Series, and T Series routers, under E1 channels, loop timing can be configured only at channel 0. When you configure on channel 0, it is applicable on all channels as internal by default.

|                                 |                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <b>loop-timing</b> —Configure loop timing (external) clocking.<br><b>no-loop-timing</b> —Configure line timing (internal) clocking.<br><b>Default:</b> no-loop-timing                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Channelized IQ and IQE SONET/SDH Loop Timing</i></li> <li>• <i>Configuring the Channelized T3 Loop Timing</i></li> <li>• <a href="#">clocking on page 452</a></li> </ul> |

## loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>loopback (local   payload   remote);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces t1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name dsl-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name shdsl-options],</code><br><code>[edit interfaces interface-name sonet-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>         | Configure a loopback connection. To turn off the loopback capability, remove the <b>loopback</b> statement from the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the **loopback** statement must be included with the **local** or **remote** option at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.

When configuring T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the **loopback** statement must be included with the **payload** option at the `[edit interfaces t1-fpc/pic/port]` hierarchy level.



**NOTE:** When configuring CE1 or CT1 interfaces on the 16-port Channelized E1/T1 MIC (MIC-3D-16CHE1-T1-CE), you must include the **loopback** statement at the `[edit interfaces ce1-fpc/pic/port]` hierarchy level, or `[edit interfaces ct1-fpc/pic/port]`

To configure loopback on channelized IQ and IQE PICs, SONET/SDH level, use the **sonet-options loopback** statement **local** and **remote** options at the controller interface (coc48, cstm16, coc12, cstm4, coc3, cstm1). It is ignored for path-level interfaces **so-fpc/pic/port** or **so-fpc/pic/port:channel**.

**Options** **local**—Loop packets, including both data and timing information, back on the local router's PIC. NxDS0 IQ interfaces do not support local loopback.

**payload**—For channelized T3, T1, and NxDS0 IQ interfaces only, loop back data only (without clocking information) on the remote router's PIC. With payload loopback, overhead is recalculated. Neither ATM-over-asymmetrical digital subscriber line (ADSL) interfaces nor ATM-over-SHDSL interfaces support payload loopback.

**remote**—Loop packets, including both data and timing information, back on the remote router's interface card. NxDS0 IQ interfaces do not support remote loopback.

**Required Privilege** interface—To view this statement in the configuration.  
**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring E3 and T3 Parameters on ATM Interfaces*
- *Configuring E1 Loopback Capability*
- *Configuring E3 Loopback Capability*
- *Configuring SONET/SDH Loopback Capability to Identify a Problem as Internal or External*
- *Configuring SHDSL Operating Mode on an ATM Physical Interface*
- *Configuring T1 Loopback Capability*
- *Configuring T3 Loopback Capability*
- [feac-loop-respond on page 552](#)

## loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)

---

|                            |                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (loopback   no-loopback);                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>aggregated-ether-options</b> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <b>fastether-options</b> ],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                           |
| <b>Description</b>         | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.                                                                                                                                                                                                                |

**NOTE:**

- By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.
  - IPv6 Neighbor Discovery Protocol (NDP) addresses are not supported on Gigabit Ethernet interfaces when loopback mode is enabled on the interface. That is, if the loopback statement is configured at the [edit interfaces *ge-fpc/pic/port* gigether-options] hierarchy level, an NDP address cannot be configured at the [edit interfaces *ge-fpc/pic/port* unit *logical-unit-number* family inet6 address] hierarchy level.
- 

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Ethernet Loopback Capability</i></li></ul>                       |

---

## loopback (Serial)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>loopback mode;</code>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Configure a loopback connection.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>                  | If you do not include this statement, there is no loopback connection.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b>mode</b> —You can specify the one of the following loopback modes: <ul style="list-style-type: none"><li>• <b>dce-local</b>—For EIA-530 interfaces only, loop packets back on the local DCE.</li><li>• <b>dce-remote</b>—For EIA-530 interfaces only, loop packets back on the remote DCE.</li><li>• <b>local</b>—Loop packets back on the local router's PIC.</li><li>• <b>remote</b>—Loop packets back on the line interface unit (LIU).</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Loopback Capability on page 306</a></li></ul>                                                                                                                                                                                                                                                                                                                                    |

## loopback-clear-timer

---

|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>loopback-clear-timer seconds;</code>                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                            |
| <b>Description</b>              | For interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations, configure a loop detection clear timer for the Link Control Protocol (LCP) component of a PPP session.                                                                       |
| <b>Options</b>                  | <b>seconds</b> —The time in seconds to wait before the loop detection flag is cleared if it is not cleared by the protocol.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 9 seconds                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Clear Loop Detected Timer on page 174</a></li></ul>                                                                                                                                                              |

## loss-priority

---

|                                 |                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>loss-priority (high   low);</code>                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">output-priority-map</a> <a href="#">classifier</a> <a href="#">premium</a> <a href="#">forwarding-class</a> <i>class-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Specify the packet loss priority value.                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <b>high</b> —Packet has high loss priority.<br><b>low</b> —Packet has low loss priority.                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Specifying an Output Priority Map</a></li></ul>                                                                                                                                                                                                  |



## loss-threshold

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>loss-threshold <i>number</i>;</code>                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <a href="#">continuity-check</a> ]                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                |
| <b>Description</b>              | Specify the number of continuity check messages lost before marking the remote MEP as down.                                                                                                                               |
| <b>Options</b>                  | <i>number</i> —The number of continuity check messages that can be lost before the remote MEP is considered down.                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Continuity Check Protocol Parameters for Fault Detection</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |

## low-plp-max-threshold

|                                 |                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>low-plp-max-threshold <i>percent</i>;</code>                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i> ]                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the drop profile fill-level for the low PLP CoS VC. When the fill level exceeds the defined percentage, all packets are dropped.                                                                                                                                                                                                                        |
| <b>Options</b>                  | <i>percent</i> —Fill-level percentage when linear RED is applied to cells with PLP.                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <a href="#">high-plp-max-threshold on page 574</a></li> <li>• <a href="#">low-plp-threshold on page 664</a></li> <li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li> <li>• <i>high-plp-max-threshold</i></li> <li>• <a href="#">queue-depth on page 800</a></li> </ul> |

## low-plp-threshold

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>low-plp-threshold percent;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options linear-red-profiles profile-name</a> ]                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the CoS VC drop profile fill-level percentage when linear RED is applied to cells with low PLP. When the fill level exceeds the defined percentage, packets with low PLP are randomly dropped by RED. This statement is mandatory.                                                                                                                                                                                                                |
| <b>Options</b>                  | <b>percent</b> —Fill-level percentage when linear RED is applied to cells with low PLP.                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li><li>• <a href="#">high-plp-max-threshold on page 574</a></li><li>• <a href="#">high-plp-threshold on page 571</a></li><li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li><li>• <i>high-plp-max-threshold</i></li><li>• <i>high-plp-threshold</i></li><li>• <a href="#">low-plp-max-threshold on page 663</a></li><li>• <a href="#">queue-depth on page 800</a></li></ul> |

## lowest-priority-defect

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | lowest-priority-defect (all-defects   err-xcon   mac-rem-err-xcon   no-defect   rem-err-xcon   xcon)                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i> ]                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Specify the lowest priority defect that is allowed to generate a Fault Alarm whenever CFM detects a defect. This configuration is done at the MEP level.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | Specify one of the following lowest priority defect options: <p><b>all-defects</b>—Allows all defects.</p> <p><b>err-xcon</b>—Allows only erroneous CCM and cross-connect CCM defects.</p> <p><b>mac-rem-err-xcon</b>—Allows only MAC, not receiving CCM, erroneous CCM, and cross-connect defects.</p> <p><b>no-defect</b>—Allows no defects.</p> <p><b>rem-err-xcon</b>—Allows only not receiving CCM, erroneous CCM, and cross-connect CCM defects.</p> <p><b>xcon</b>—Allows only cross-connect CCM defects.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Maintenance End Point Lowest Priority Defect</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |

## lsq-failure-options

---

|                                 |                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>lsq-failure-options {<br/>    no-termination-request;<br/>    [trigger-link-failure <i>interface-name</i>];<br/>}</code> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>lsq-fpc/pic/port</i> ]                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | For AS PIC or MultiServices PIC link services IQ ( <b>lsq</b> ) interfaces only, define the failure recovery option settings.  |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>              |

## mac

---

|                                 |                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac <i>mac-address</i>;</code>                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                        |
| <b>Description</b>              | Set the MAC address of the interface. You can configure the MAC address on the management Ethernet interface ( <b>fxp0</b> or <b>em0</b> ) only.                                                                         |
| <b>Options</b>                  | <b>mac-address</b> —MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> . For example, 0011.2233.4455 or 00:11:22:33:44:55. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the MAC Address on the Management Ethernet Interface</i></li><li>• <i>Configuring a Pseudowire Subscriber Logical Interface Device</i></li></ul>                  |

## mac-address (Accept Source Mac)

|                                 |                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac-address <i>mac-address</i> <a href="#">policer</a>;</code>                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">accept-source-mac</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">accept-source-mac</a> ]                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                 |
| <b>Description</b>              | For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), for Gigabit Ethernet DPCs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP, specify a remote MAC address on which to count incoming and outgoing packets. |
| <b>Options</b>                  | <b><i>mac-address</i></b> —MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> . For example, 0011.2233.4455 or 00:11:22:33:44:55.<br><br><b><i>policer</i></b> —MAC policer. For more information, see <a href="#">policer (MAC)</a> .        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring MAC Address Filtering</a></li> </ul>                                                                                                                                                                                                                                       |

## mac-address (VLAN and Stacked VLAN Interfaces)

|                                 |                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac-address;</code>                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges</a> <a href="#">authentication</a> <a href="#">username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges</a> <a href="#">authentication</a> <a href="#">username-include</a> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Specify that the client hardware address (chaddr) from the incoming DHCP discover packet be concatenated with the username during the subscriber authentication process.                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring VLAN Interface Username Information for AAA Authentication</a></li> </ul>                                                                                                                                                                           |

## mac-learn-enable

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac-learn-enable;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <b>ethernet-switch-profile</b> ]<br>[edit interfaces aex aggregated-ether-options ethernet-switch-profile]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for statement under the [edit interfaces aex aggregated-ether-options <b>ethernet-switch-profile</b> ] hierarchy introduced in Junos OS Release 15.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), for Gigabit Ethernet DPCs on MX Series routers, for 100-Gigabit Ethernet Type 5 PIC with CFP, and for MPC3E, MPC4E, MPC5E, MPC5EQ, and MPC6E MPCs, configure dynamic learning of the source and destination MAC addresses. By default, the interface is not allowed to dynamically learn source and destination MAC addresses.</p> <p>To disable dynamic learning of the source and destination MAC addresses after it has been configured, you must delete <b>mac-learn-enable</b> from the configuration.</p> <p>MPCs support MAC address accounting for an individual interface or an aggregated Ethernet interface member link only after the interface has received traffic from the MAC source. If traffic is only exiting an interface, the MAC address is not learned and MAC address accounting does not occur.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering</i></li><li>• <i>Configuring MAC Address Accounting</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## mac-validate

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac-validate (loose   strict);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Enable IP and MAC address validation for static Ethernet, IP demux interfaces, and VLAN demux interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>loose</b>—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the IP source address matches one of the trusted tuples, but the MAC address does not match the MAC address of the tuple. Continues to forward incoming packets when the source address of the incoming packet does not match any of the trusted IP addresses.</p> <p><b>strict</b>—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the MAC address does not match the tuple's MAC source address, or when IP source address of the incoming packet does not match any of the trusted IP addresses.</p> |
| <b>Required Privilege Level</b> | <p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">MAC Address Validation on Static Ethernet Interfaces Overview</a></li> <li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li> <li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## maintenance-association

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> maintenance-association <i>ma-name</i> {   <b>short-name-format</b> (character-string   vlan   2octet   rfc-2685-vpn-id);   protect-maintenance-association <i>protect-ma-name</i>;   remote-maintenance-association <i>remote-ma-name</i>;   <b>continuity-check</b> {     <b>hold-interval</b> <i>minutes</i>;     <b>interval</b> (10m   10s   1m   1s   100ms);     <b>loss-threshold</b> <i>number</i>;   }   <b>mep</b> <i>mep-id</i> {     <b>auto-discovery</b>;     <b>direction</b> (up   down);     <b>interface</b> <i>interface-name</i> (protect   working);     <b>lowest-priority-defect</b> (all-defects   err-xcon   mac-rem-err-xcon   no-defect         rem-err-xcon   xcon );     <b>priority</b> <i>number</i>;     <b>remote-mep</b> <i>mep-id</i> {       <b>action-profile</b> <i>profile-name</i>;       <b>sla-iterator-profile</b> <i>profile-name</i> {         <b>data-tlv-size</b> <i>size</i>;         <b>iteration-count</b> <i>count-value</i>;         <b>priority</b> <i>priority-value</i>;       }     }   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet connectivity-fault-management maintenance-domain</b> <i>domain-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure the name of the maintenance association in IEEE-compliant format.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <b>ma-name</b> —The name of the maintenance association within the maintenance domain.<br><br>The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



## maintenance-domain

```
Syntax maintenance-domain domain-name {
 bridge-domain name <vlan-id [vlan-ids]>;
 instance vpls-instance-name;
 level number;
 maintenance-association ma-name {
 protect-maintenance-association protect-ma-name;
 remote-maintenance-association remote-ma-name;
 short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
 continuity-check {
 hold-interval minutes;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number
 }
 }
 mep mep-id {
 auto-discovery;
 direction (up | down);
 interface interface-name (protect | working);
 lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
 rem-err-xcon | xcon);
 priority number;
 remote-mep mep-id {
 action-profile profile-name;
 sla-iterator-profile profile-name {
 data-tlv-size size;
 iteration-count count-value;
 priority priority-value;
 }
 }
 }
 mip-half-function (none | default | explicit);
 name-format (character-string | none | dns | mac+2oct);
}
virtual-switch name {
 bridge-domain name <vlan-id [vlan-ids]>;
}
```

**Hierarchy Level** [edit protocols **oam ethernet connectivity-fault-management**]

**Release Information** Statement introduced in Junos OS Release 8.4.  
Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.  
Support for multiple down MEP introduced in Junos OS Release 15.1R1 for MX Series Routers.

**Description** Configure the name of the maintenance domain in IEEE-compliant format.



**NOTE:** For MX Series Routers, you can configure multiple down MEPs for a single instance of maintenance domain identifier and maintenance

association name to monitor services provided on Virtual Private LAN Service (VPLS), bridge, circuit cross-connect (CCC), and IPv4 domains.

.....

**Options** *domain-name*—Name of the maintenance domain.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Creating a Maintenance Domain*
- *Configuring a MEP to Generate and Respond to CFM Protocol Messages*
- *Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers*

---

## master-only

---

**Syntax** master-only;

**Hierarchy Level** [edit groups rex interfaces (fxp0 | em0) unit *logical-unit-number* family *family address*],  
[edit groups rex logical-systems *logical-system-name* interfaces fxp0 unit *logical-unit-number* family *family address*],  
[edit interfaces (fxp0 | em0) unit *logical-unit-number* family *family address*],  
[edit logical-systems *logical-system-name* interfaces fxp0 unit *logical-unit-number* family *family address*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** Configure the IP address to be used when the Routing Engine is the current master.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring a Consistent Management IP Address*
- *CLI User Guide*

## maximum-contexts

|                                 |                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>maximum-contexts <i>number</i> &lt;force&gt;;</code>                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">compression</a> rtp],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">compression</a> rtp]                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Specify the maximum number of RTP contexts to accept during negotiation.                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b><i>number</i></b>—Maximum number of contexts.</p> <p><b><i>force</i></b>—(Optional) Requires the PIC to use the value specified for maximum RTP contexts, regardless of the negotiated value. This option allows the software to interoperate with Junos OS Releases that base the RTP context value on link speed.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                           |

## maximum-requests

|                                 |                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>maximum-requests <i>times</i>;</code>                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                      |
| <b>Description</b>              | Specify the maximum number of retransmission times of an EAPOL Request packet to the client before it times out the authentication session.                                                                                                                                        |
| <b>Options</b>                  | <p><b><i>times</i></b>—Specify the maximum number of retransmission times.</p> <p><b>Range:</b> 1 through 10 times</p> <p><b>Default:</b> 2 times</p>                                                                                                                              |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">authenticator on page 420</a></li> <li>• <a href="#">dot1x on page 498</a></li> <li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li> </ul> |

## maximum-vcs

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>maximum-vcs <i>maximum-vcs</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <b>atm-options</b> <i>vpi vpi-identifier</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For ATM1 interfaces, configure the maximum number of virtual circuits (VCs) allowed on a virtual path (VP). When configuring ATM1 interfaces on the router, you must include this statement.</p> <p>For a configured virtual path identifier (VPI), valid virtual channel identifier (VCI) numbers are from 0 through (<i>maximum-vcs</i> value – 1). VCI numbers 0 through 31 are reserved by the ATM Forum. It is recommended that you use a VCI number higher than 31 when connecting to an ATM switch.</p> |
| <b>Options</b>                  | <p><i>maximum-vcs</i>—Maximum number of VCs on the VP.</p> <p><b>Range:</b> 1 through 4090</p>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Maximum Number of ATM1 VCs on a VP</i></li><li>• <a href="#">multipoint-destination on page 694</a></li><li>• <a href="#">promiscuous-mode on page 791</a></li><li>• <a href="#">vci on page 927</a></li></ul>                                                                                                                                                                                                                                         |

## mc-ae

**Syntax**

```
mc-ae {
 chassis-id chassis-id;
 events {
 iccp-peer-down;
 force-icl-down;
 prefer-status-control-active;
 }
 init-delay-time seconds;
 mc-ae-id mc-ae-id;
 mode (active-active | active-standby);
 redundancy-group group-id;
 status-control (active | standby);
 switchover-mode (non-revertive | revertive);
}
```

**Hierarchy Level** [edit interfaces aeX aggregated-ether-options],  
[edit logical-systems *logical-system-name* interfaces aeX aggregated-ether-options]

**Release Information** Statement introduced in Junos OS Release 9.6 for MX Series routers.  
**events** statement introduced in Junos OS Release 11.4R4 for MX Series routers.  
 Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  
**prefer-status-control-active** statement introduced in Junos OS Release 13.2R1 for EX Series switches.  
**init-delay-time seconds** statement introduced in Junos OS Release 13.2R3 for EX Series switches.  
 Statement introduced in Junos OS Release 12.2 for the QFX Series. Only the **chassis-id**, **mc-ae-id**, **mode active-active**, and **status-control (active | standby)** options are supported on QFX Series devices.

**Description** Enable multichassis link aggregation groups (MC-LAGs), which enables one device to form a logical LAG interface with two or more other devices.

**Options** **chassis-id *chassis-id***—Specify the chassis ID for Link Aggregation Control Protocol (LACP) to calculate the port number of MC-LAG physical member links.

**Values:** 0 or 1

**events**—Specify an action if a specific MC-LAG event occurs.

**iccp-peer-down**—Specify an action if the ICCP peer of this node goes down.

**force-icl-down**—If the node's ICCP peer goes down, bring down the interchassis-link logical interface.

**prefer-status-control-active**—Specify that the node configured as **status-control active** become the active node if the peer of this node goes down.



**BEST PRACTICE:** We recommend that you configure **prefer-status-control-active** statement with the **mc-ae status-control active** configuration. Do not configure the

**prefer-status-control-active** statement with the **mc-ae status-control standby** configuration.



**NOTE:** If you configure both nodes as **prefer-status-control-active**, you must also configure ICCP peering using the peer's loopback address to make sure that the ICCP session does not go down because of physical link failures. Additionally, you must configure backup liveness detection on both of the MC-LAG nodes.

**init-delay-time seconds**—To minimize traffic loss, specify the number of seconds in which to delay bringing the multichassis aggregated Ethernet interface back to the up state when you reboot an MC-LAG peer.

**mc-ae-id mc-ae-id**—Specify the identification number of the MC-LAG device. The two MC-LAG network devices that manage a given MC-LAG must have the same identification number.

**Range:** 1 through 65,535

**mode (active-active | active-standby)**—Specify whether the MC-LAG is in active-active or active-standby mode.



**NOTE:** You can configure IPv4 (inet) and IPv6 (inet6) addresses on mc-ae interfaces when the active-standby mode is configured.

**redundancy-group group-id**—Specify the redundancy group identification number. The Inter-Chassis Control Protocol (ICCP) uses the redundancy group ID to associate multiple chassis that perform similar redundancy functions.

**Range:** 1 through 4,294,967,294

**revert-time**—Wait interval (in minutes) before the switchover to the preferred node is performed when the **switchover-mode** is configured as revertive.

**Range:** 1 through 10

**status-control (active | standby)**—Specify whether the chassis becomes active or remains in standby mode when an interchassis link failure occurs.

**switchover-mode (non-revertive | revertive)**—Specify whether Junos OS should trigger a link switchover to the preferred node when the active node is available.



**NOTE:** For revertive mode to automatically switch over to the preferred node, the **status-control** statement needs to be configured as active.

|                                 |                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Active-Active Bridging and VRRP over IRB Functionality Overview</i></li> <li>• <i>Configuring Multichassis Link Aggregation on MX Series Routers</i></li> <li>• <i>Configuring Multichassis Link Aggregation on EX Series Switches</i></li> </ul> |

## member-interface-speed

|                                 |                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | member-interface-speed <i>speed</i> ;                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces container-options <a href="#">member-interface-type</a> ]                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                                                                                   |
| <b>Description</b>              | Specify container-interface member-interface speed options.                                                                                                                                                                                                     |
| <b>Options</b>                  | <i>speed</i> —Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li> <li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li> <li>• <a href="#">container-options on page 464</a></li> </ul> |

## member-interface-type

---

|                                 |                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>member-interface-type sonet {<br/>    <a href="#">member-interface-speed</a> [ <i>speed</i> ];<br/>}</code>                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">container-options</a> ]                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                                                                               |
| <b>Description</b>              | Specify container-interface member-interface type as sonet and speed options.                                                                                                                                                                               |
| <b>Options</b>                  | <b>sonet</b> —Protocol type of the container interface, specify sonet.<br><br><b>speed</b> —Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li><li>• <a href="#">container-options on page 464</a></li></ul> |



## mep

|                                 |                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> mep mep-id {   action-profile action-profile-name   auto-discovery;   direction (up   down);   interface interface-name (protect   working);   priority number;   remote-mep mep-id {     action-profile profile-name;     sla-iterator-profile profile-name {       data-tlv-size size;       iteration-count count-value;       priority priority-value;     }   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name</a> ]                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | The numeric identifier of the maintenance association end point (MEP) within the maintenance association.                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>mep mep-id</b>—Specify the numeric identifier of the MEP.</p> <p><b>Range:</b> 1 through 8191</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Alarm Indication Signal (ETH-AIS) Function Overview</i></li> <li>• <i>Configuring ETH-AIS on a CFM MEP</i></li> <li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li> </ul>                                                                                                                     |

## minimum-links

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>minimum-links <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces aex <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces aex <a href="#">aggregated-sonet-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ],<br>[edit interfaces interface-range <i>range</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>range</i> <a href="#">aggregated-sonet-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ]                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | For aggregated Ethernet, SONET/SDH, multilink, link services, and voice services interfaces only, set the minimum number of links that must be up for the bundle to be labeled up.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><i>number</i>—Number of links.</p> <p><b>Range:</b> On M120, M320, MX Series, T Series, and TX Matrix routers with Ethernet interfaces, the valid range for minimum-links number is 1 through 64. When the maximum value (16) is specified, all configured links of a bundle must be up for the bundle to be labeled up. On all other routers and on EX Series switches, other than EX8200 switches, the range of valid values for minimum-links number is 1 through 8. When the maximum value (8) is specified, all configured links of a bundle must be up for the bundle to be labeled up. On EX8200 switches, the range of valid values for minimum-links number is 1 through 12. When the maximum value (12) is specified, all configured links of a bundle must be up for the bundle to be labeled up.</p> <p><b>Default:</b> 1</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Aggregated Ethernet Minimum Links</i></li> <li>• <i>Configuring Aggregated SONET/SDH Interfaces</i></li> <li>• <i>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li> <li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                    |

## mip-half-function

|                            |                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | mip-half-function (none   default   explicit);                                                                                                                                              |
| <b>Hierarchy Level</b>     | [edit protocols <a href="#">oam ethernet connectivity-fault-management</a> <i>md-name</i> ],<br>[edit protocols <a href="#">oam ethernet connectivity-fault-management</a> <i>ma-name</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.6.                                                                                                                                               |
| <b>Description</b>         | Specify the OAM Ethernet CFM maintenance domain MIP half functions.                                                                                                                         |



**NOTE:** Whenever a MIP is configured and a bridge domain is mapped to multiple maintenance domains or maintenance associations, it is essential that the `mip-half-function` value for all maintenance domains and maintenance associations are the same.

|                                 |                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <p><b>none</b>—Specify to not use the mip-half-function.</p> <p><b>default</b>—Specify to use the default mip-half-function.</p> <p><b>explicit</b>—Specify an explicit mip-half-function.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Domain</i></li> <li>• <a href="#">maintenance-domain on page 671</a></li> </ul>                                             |

## mlfr-uni-nni-bundle-options

---

**Syntax**    mlfr-uni-nni-bundle-options {  
              [acknowledge-retries](#) *number*;  
              [acknowledge-timer](#) *milliseconds*;  
              [action-red-differential-delay](#) (disable-tx | remove-link);  
              [drop-timeout](#) *milliseconds*;  
              [fragment-threshold](#) *bytes*;  
              [hello-timer](#) *milliseconds*;  
              [link-layer-overhead](#) *percent*;  
              [lmi-type](#) (ansi | itu | c-lmi);  
              [minimum-links](#) *number*;  
              mrru *bytes*;  
              [n391](#) *number*;  
              [n392](#) *number*;  
              [n393](#) *number*;  
              [red-differential-delay](#) *milliseconds*;  
              [t391](#) *seconds*;  
              [t392](#) *number*;  
              [yellow-differential-delay](#) *milliseconds*;  
              }

**Hierarchy Level**    [edit interfaces *interface-name*]

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure link services and voice services interface management properties.  
  
                    The statements are explained separately.

**Required Privilege Level**    interface—To view this statement in the configuration.  
                                  interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring Frame Relay Keepalives](#)
- [lmi \(Frame Relay\) on page 648](#)
- [lmi-type on page 651](#)
- [Junos OS Services Interfaces Library for Routing Devices](#)

## mode (Dynamic Profiles)

|                                 |                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | mode loose;                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit dynamic-profiles <i>profile-name</i> <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> (inet) <b>rpf-check</b> ]                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Check whether the packet has a source address with a corresponding prefix in the routing table. If a corresponding prefix is not found, unicast reverse path forwarding (RPF) loose mode does not accept the packet. Unlike strict mode, loose mode does not check whether the interface expects to receive a packet with a specific source address prefix. |
| <b>Default</b>                  | If you do not include this statement, unicast RPF is in strict mode.                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Unicast RPF Strict Mode on page 220</a></li> </ul>                                                                                                                                                                                                                                         |

## mode (Interfaces)

|                                 |                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | mode loose;                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> (inet   inet6) <b>rpf-check</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> (inet   inet6) <b>rpf-check</b> ]                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Check whether the packet has a source address with a corresponding prefix in the routing table. If a corresponding prefix is not found, unicast reverse path forwarding (RPF) loose mode does not accept the packet. Unlike strict mode, loose mode does not check whether the interface expects to receive a packet with a specific source address prefix. |
| <b>Default</b>                  | If you do not include this statement, unicast RPF is in strict mode.                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Unicast RPF Strict Mode on page 220</a></li> </ul>                                                                                                                                                                                                                                         |

## monitor-session

---

|                                 |                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>monitor-session (<i>interface-name</i>   all);</code>                                                                                                              |
| <b>Hierarchy Level</b>          | [edit protocols ppp]                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.                                                                                                                            |
| <b>Description</b>              | Monitor PPP packet exchanges. When monitoring is enabled, packets exchanged during a session are logged to the default log of <code>/var/log/pppd</code> .               |
| <b>Default</b>                  | If you do not include this statement, no PPPD-specific monitoring operations are performed.                                                                              |
| <b>Options</b>                  | <code>all</code> —Monitor PPP packet exchanges on all sessions.<br><br><code><i>interface-name</i></code> —Logical interface name on which to enable session monitoring. |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Monitoring a PPP Session on page 132</a></li></ul>                                                                   |

## mpls (Interfaces)

---

|                                 |                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>mpls {<br/>  pop-all-labels {<br/>    required-depth <i>number</i>;<br/>  }<br/>}</pre>                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options],<br>[edit interfaces <i>interface-name</i> sonet-options],<br>[edit interfaces <i>interface-name</i> fastether-options],<br>[edit interfaces <i>interface-name</i> gigether-options]               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                      |
| <b>Description</b>              | For passive monitoring on ATM and SONET/SDH interfaces and 10-Gigabit Ethernet interfaces in WAN PHY mode, process incoming IP packets that have MPLS labels.<br><br>The remaining statements are explained separately.                                |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing MPLS Labels from Incoming Packets</i></li><li>• <i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul> |

## mtu

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>mtu bytes;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | <p>[edit interfaces <i>interface-name</i>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i>],</p> <p>[edit interfaces <i>interface-range name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols l2vpn interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols vpls],</p> <p>[edit protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>],</p> <p>[edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols l2vpn interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols vpls]</p> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Layer 2 VPNs and VPLS introduced in Junos OS Release 10.4.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Support at the [set interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i>] hierarchy level introduced in Junos OS Release 12.3R3 for MX Series routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>         | <p>Specify the maximum transmission unit (MTU) size for the media or protocol. The default MTU size depends on the device type. Changing the media MTU or protocol MTU causes an interface to be deleted and added again.</p> <p>To route jumbo data packets on an integrated routing and bridging (IRB) interface or routed VLAN interface (RVI) on EX Series switches, you must configure the jumbo MTU size on the member physical interfaces of the VLAN that you have associated with the IRB interface or RVI, as well as on the IRB interface or RVI itself (the interface named <i>irb</i> or <i>vlan</i>, respectively).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



**CAUTION:** For EX Series switches, setting or deleting the jumbo MTU size on an IRB interface or RVI while the switch is transmitting packets might cause packets to be dropped.



---

**NOTE:**

The MTU for an IRB interface is calculated by removing the Ethernet header overhead [6(DMAC)+6(SMAC)+2(EtherType)]. Because, the MTU is the lower value of the MTU configured on the IRB interface and the MTU configured on the IRB's associated bridge domain IFDs or IFLs, the IRB MTU is calculated as follows:

- In case of Layer 2 IFL configured with the `flexible-vlan-tagging` statement, the IRB MTU is calculated by including 8 bytes overhead (SVLAN+CVLAN).
  - In case of Layer 2 IFL configured with the `vlan-tagging` statement, the IRB MTU is calculated by including a single VLAN 4 bytes overhead.
-





## NOTE:

- If a packet whose size is larger than the configured MTU size is received on the receiving interface, the packet is eventually dropped. The value considered for MRU (maximum receive unit) size is also the same as the MTU size configured on that interface.
- Not all devices allow you to set an MTU value, and some devices have restrictions on the range of allowable MTU values. You cannot configure an MTU for management Ethernet interfaces (fxp0, em0, or me0) or for loopback, multilink, and multicast tunnel devices.
- On ACX Series routers, you can configure the protocol MTU by including the `mtu` statement at the [edit interfaces *interface-name* unit *logical-unit-number* family inet] or [edit interfaces *interface-name* unit *logical-unit-number* family inet6] hierarchy level.
  - If you configure the protocol MTU at any of these hierarchy levels, the configured value is applied to all families that are configured on the logical interface.
  - If you are configuring the protocol MTU for both inet and inet6 families on the same logical interface, you must configure the same value for both the families. It is not recommended to configure different MTU size values for inet and inet6 families that are configured on the same logical interface.
- For IRB interfaces, MTU is calculated by removing the Ethernet header overhead ( $6(\text{DMAC}) + 6(\text{SMAC}) + 2(\text{EtherType})$ ), and the MTU is a minimum of the two values:
  - Configured MTU
  - Associated bridge domain's physical or logical interface MTU
    - For Layer 2 logical interfaces configured with flexible-vlan-tagging, IRB MTU is calculated by including 8 bytes overhead (SVLAN+CVLAN).
    - For Layer 2 logical interfaces configured with vlan-tagging, IRB MTU is calculated by including single VLAN 4 bytes overhead.



NOTE: Changing the Layer 2 logical interface option from vlan-tagging to flexible-vlan-tagging or vice versa adjusts the logical interface MTU by 4 bytes with the existing MTU size. As a result, the Layer 2 logical interface is deleted and re-added, and the IRB MTU is re-computed appropriately.

For more information about configuring MTU for specific interfaces and router or switch combinations, see *OBSOLETE: Configuring the Media MTU*.

**Options**    *bytes*—MTU size.

**Range:** 256 through 9192 bytes, 256 through 9216 (EX Series switch interfaces), 256 through 9500 bytes (Junos OS 12.1X48R2 for PTX Series routers)


**Default:** 1500 bytes (INET, INET6, and ISO families), 1448 bytes (MPLS), 1514 bytes (EX Series switch interfaces)

**Required Privilege**    interface—To view this statement in the configuration.

**Level**    interface-control—To add this statement to the configuration.

- Related Documentation**
- *OBSOLETE: Configuring the Media MTU*
  - *Configuring the MTU for Layer 2 Interfaces*
  - *OBSOLETE-Setting the Protocol MTU*

## multi-chassis-protection

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>multi-chassis-protection {   peer a.b.c.d {     interface interface-name;   } }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>For MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces, you can use this statement under the physical interface level to reduce the configuration at the logical interface level if the following assumption exists:</p> <p>If there are <math>n + 1</math> logical interfaces under <b>ae0</b>, from <b>ae0.0</b> through <b>ae0.n</b>, there will be <math>n + 1</math> logical interfaces under <b>ge-0/0/0</b> as well, from <b>ge-0/0/0.0</b> through <b>ge-0/0/0.n</b>, and each <b>ge-0/0/0</b> logical interface will be a protection link for the <b>ae0</b> logical interface.</p> <hr/> <div>  <p><b>NOTE:</b> A bridge domain cannot have MC-AE logical interfaces which belong to different redundancy groups.</p> </div> <hr/> <p>If the Inter-Chassis Control Protocol (ICCP) connection is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer.</p> <p>The remaining statements are explained separately.</p> |
| <b>Options</b>                  | <b>interface <i>interface-name</i></b> —Specify the interface: <b>interface <i>interface-name-fpc/pic/port</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Multichassis Link Aggregation on MX Series Routers</i></li> <li>• <i>Configuring Active-Active Bridging and VRRP over IRB in Multichassis Link Aggregation</i></li> <li>• <i>Configuring Aggregated Ethernet Link Protection</i></li> <li>• <i>Example: Configuring Aggregated Ethernet Link Protection</i></li> <li>• <a href="#">peer on page 757</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## multicast-dlci

---

|                                 |                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multicast-dlci <i>dlci-identifier</i>;</code>                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | For point-to-multipoint Frame Relay, link services, and voice services interfaces only, enable multicast support on the interface. You can configure multicast support on the interface if the Frame Relay switch performs multicast replication.                                                                   |
| <b>Options</b>                  | <i>dlci-identifier</i> —DLCI identifier, a number from 16 through 1022 that defines the Frame Relay DLCI over which the switch expects to receive multicast packets for replication.                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Multicast-Capable Frame Relay Connection</a></li><li>• <a href="#">dlci on page 496</a></li><li>• <a href="#">multipoint-destination on page 694</a></li><li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li></ul> |

## multicast-only

---

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multicast-only;</code>                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                  |
| <b>Description</b>              | Configure the unit and family so that it can transmit and receive multicast traffic only. You can configure this property on the IP family only.                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Protocol Family on page 186</a></li><li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li><li>• <a href="#">tunnel on page 905</a></li></ul>                      |

---

## multicast-statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | multicast-statistics;                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | For Ethernet, SONET, aggregated Ethernet, and aggregated SONET interfaces in T Series or TX Matrix routers, specify support for multicast statistics on a physical interface to enable multicast accounting for all the logical interfaces below the physical interface.                                                                                                                                |
| <b>Default</b>                  | not enabled—must be configured to enable                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Multicast Statistics Collection on Aggregated Ethernet Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on Aggregated SONET Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on Ethernet Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on SONET Interfaces</i></li></ul> |

## multicast-vci

---

|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multicast-vci vpi-identifier.vci-identifier;</code>                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ]              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                             |
| <b>Description</b>              | For ATM encapsulation only, and for point-to-multipoint ATM logical interfaces only, enable the support of multicast on the interface. You can configure multicast support on the interface if the ATM switch performs multicast replication. |
| <b>Options</b>                  | <p><i>vci-identifier</i>—ATM virtual circuit identifier.<br/><b>Range:</b> 0 through 16,384</p> <p><i>vpi-identifier</i>—ATM virtual path identifier.<br/><b>Range:</b> 0 through 255<br/><b>Default:</b> 0</p>                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Multicast-Capable ATM1 or ATM2 IQ Connection</i></li><li>• <a href="#">multipoint-destination on page 694</a></li><li>• <a href="#">vci on page 927</a></li></ul>                    |

## multilink-max-classes

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multilink-max-classes <i>number</i>;</code>                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | For Adaptive Services (AS) PIC link services IQ interfaces ( <b>lsq</b> ) only, configure the number of multilink classes to be negotiated when a link joins the bundle.                                       |
| <b>Options</b>                  | <b><i>number</i></b> —The number of multilink classes to be negotiated when a link joins the bundle.<br><b>Range:</b> 1 through 8<br><b>Default:</b> None                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">multipoint on page 693</a></li> </ul>                                          |

## multipoint

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multipoint;</code>                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | Configure the interface unit as a multipoint connection.                                                                                                                                                       |
| <b>Default</b>                  | If you omit this statement, the interface unit is configured as a point-to-point connection.                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Multipoint Connection on page 173</a></li> <li>• <a href="#">point-to-point on page 765</a></li> </ul>                                      |

## multipoint-destination

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> multipoint-destination address dlcidlcid-identifier; multipoint-destination address {     epd-threshold cells;     inverse-arp;     oam-liveness {         down-count cells;         up-count cells;     }     oam-period (disable   seconds);     shaping {         (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst         length);         queue-length number;     }     vci vpi-identifier.vci-identifier; } </pre>                                                                                   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i>]</p>                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For point-to-multipoint Frame Relay or ATM interfaces only, enable the support of multicast on the interface. You can configure multicast support on the interface if the Frame Relay or ATM switch performs multicast replication.                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>address</b>—Address of the remote side of the point-to-multipoint connection.</p> <p><b>dlci-identifier</b>—For Frame Relay interfaces, the data-link connection identifier.<br/> <b>Range:</b> 0 through 0xFFFFFFFF (24 bits)</p> <p><b>vci-identifier</b>—For ATM interfaces, the virtual circuit identifier.<br/> <b>Range:</b> 0 through 16,384</p> <p><b>vpi-identifier</b>—For ATM interfaces, the virtual path identifier.<br/> <b>Range:</b> 0 through 255<br/> <b>Default:</b> 0</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</a></li> <li>• <a href="#">Configuring a Point-to-Multipoint Frame Relay Connection</a></li> <li>• <a href="#">dlci on page 496</a></li> <li>• <a href="#">encapsulation (Logical Interface) on page 522</a></li> </ul>                                                                                                                                                                                                                          |



## multiservice-options

|                                 |                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> multiservice-options {   (syslog   no-syslog);   (core-dump   no-core-dump);   (dump-on-flow-control);   flow-control-options {     down-on-flow-control;     dump-on-flow-control;     reset-on-flow-control;   } } </pre>                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>mo-fpc/pic/port</i> ]                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For monitoring services interfaces only, configure multiservice-specific interface properties.</p> <p>The statements are explained separately.</p>                                                                                                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">passive-monitor-mode on page 751</a></li> </ul> |

## n391

---

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | n391 <i>number</i> ;                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For link services and voice services interfaces only, set the Frame Relay full status polling interval.                                                                                                                                                                                            |
| <b>Options</b>                  | <i>number</i> —Polling interval.<br><b>Range:</b> 1 through 255<br><b>Default:</b> 6                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n392 on page 697</a></li><li>• <a href="#">n393 on page 698</a></li><li>• <a href="#">timeslots on page 882</a></li><li>• <a href="#">t392 on page 874</a></li></ul> |

---

## n392

---

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | n392 <i>number</i> ;                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For link services and voices interfaces only, set the Frame Relay error threshold, in number of errors.                                                                                                                                                                                            |
| <b>Options</b>                  | <i>number</i> —Error threshold.<br><b>Range:</b> 1 through 10<br><b>Default:</b> 3                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n391 on page 696</a></li><li>• <a href="#">n393 on page 698</a></li><li>• <a href="#">timeslots on page 882</a></li><li>• <a href="#">t392 on page 874</a></li></ul> |

## n393

---

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | n393 <i>number</i> ;                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For link services and voices interfaces only, set the Frame Relay monitored event count.                                                                                                                                                                                                           |
| <b>Options</b>                  | <i>number</i> —Number of event count.<br><b>Range:</b> 1 through 10<br><b>Default:</b> 4                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n391 on page 696</a></li><li>• <a href="#">n392 on page 697</a></li><li>• <a href="#">timeslots on page 882</a></li><li>• <a href="#">t392 on page 874</a></li></ul> |


## name-format

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | name-format (character-string   none   dns   mac+2oct);                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> domain-name]                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Specify the format of the maintenance domain name.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>character-string</b>—The name is an ASCII character string.</p> <p><b>none</b>—The maintenance domain name is not used.</p> <p><b>dns</b>—The name is in domain name service (DNS) format. For example: www.juniper.net.</p> <p><b>mac+2oct</b>—Name is the MAC address plus a two-octet maintenance association identifier. For example: 08:00:22:33:44:55.100.</p> <p><b>Default:</b> character-string</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul>                                                                                                                                                                                                                            |

## native-vlan-id

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>native-vlan-id <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ge-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>         | <p>Configure mixed tagging support for untagged packets on a port for the following:</p> <ul style="list-style-type: none"><li>• M Series routers with Gigabit Ethernet IQ PICs with SFP and Gigabit Ethernet IQ2 PICs with SFP configured for 802.1Q flexible VLAN tagging</li><li>• MX Series routers with Gigabit Ethernet DPCs and MICs, Tri-Rate Ethernet DPCs and MICs, and 10-Gigabit Ethernet DPCs and MICs and MPCs configured for 802.1Q flexible VLAN tagging</li><li>• T4000 routers with 100-Gigabit Ethernet Type 5 PIC with CFP</li><li>• EX Series switches with Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces</li></ul> <p>When the <b>native-vlan-id</b> statement is included with the <b>flexible-vlan-tagging</b> statement, untagged packets are accepted on the same mixed VLAN-tagged port.</p> <div> <b>NOTE:</b> The logical interface on which untagged packets are received must be configured with the same VLAN ID as the native VLAN ID configured on the physical interface, otherwise the untagged packets are dropped.</div> <p>To configure the logical interface, include the <b>vlan-id</b> statement (matching the <b>native-vlan-id</b> statement on the physical interface) at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>] hierarchy level.</p> <p>When the <b>native-vlan-id</b> statement is included with the <i>interface-mode</i> statement, untagged packets are accepted and forwarded within the bridge domain or VLAN that is configured with the matching VLAN ID.</p> |
| <b>Default</b>             | By default, the untagged packets are dropped. That is, if you do not configure the <b>native-vlan-id</b> option, the untagged packets are dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>             | <b><i>number</i></b> —VLAN ID number.<br><b>Range:</b> (ACX Series routers and EX Series switches) 0 through 4094.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Mixed Tagging Support for Untagged Packets*
- *Configuring Access Mode on a Logical Interface*
- *Configuring the Native VLAN Identifier (CLI Procedure)*
- *Understanding Bridging and VLANs on EX Series Switches*
- [flexible-vlan-tagging on page 555](#)
- *Understanding Q-in-Q Tunneling on EX Series Switches*

## ncp-max-conf-req

**Syntax** `ncp-max-conf-req number`

**Hierarchy Level** [edit interfaces *so-fpc/pic/port* **unit** *number* **ppp-options**]

**Release Information** Statement introduced in Junos OS Release 9.6.

**Description** Set the maximum number of NCP Configure-Requests to be sent, after which the router goes to NCP down state.

**Options** *number*—Ranges from 0 to 65535, where 0 means send infinite NCP Configure-Requests and any other value specifies the maximum number NCP Configure-Requests to send and then stop sending.

**Default**—254

**Range:** 0 through 65,535

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring the NCP Configure-Request Maximum Sent on page 175](#)
- [ppp-options on page 781](#)


## ncp-restart-timer

---

|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ncp-restart-timer <i>milliseconds</i>;</code>                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.                                                                                                                                                                                                                                            |
| <b>Description</b>              | For interfaces with PPP and PPP TCC encapsulations and on multilink PPP bundle interfaces, configure a restart timer for the Network Control Protocol (NCP) component of a PPP session.                                                                                                  |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —The time in milliseconds between successive NCP configuration requests.<br><b>Range:</b> 500 through 10,000 milliseconds<br><b>Default:</b> 3 seconds                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Restart Timers on page 173</a></li></ul>                                                                                                                                                                         |



## nd6-stale-time

|                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                      | <code>nd6-stale-time <i>seconds</i>;</code>                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                             | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6]                                                                                                                                                                                                               |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                         | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.1 for EX Series switches.                                                                                                                                                                            |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                 | Set the stale timer for IPv6 neighbor reachability confirmation. Reachability of the IPv6 neighbors is confirmed only after the stale timer has expired. For example, by setting the stale timer to 180 seconds, users can specify that IPv6 neighbor reachability be confirmed every 180 seconds. |
| <div>  <p><b>NOTE:</b> When the Routing Engine sends a control packet to an IPv6 neighbor, the stale timer is the maximum interval in which neighbor reachability is confirmed. In such cases, IPv6 neighbor reachability is confirmed before the stale timer expires.</p> </div> |                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>                                                                                                                                                                                                                                                                                                                                                     | Default is 20 minutes (1200 seconds)                                                                                                                                                                                                                                                               |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                     | <i>seconds</i> —Duration in seconds.<br><b>Range:</b> 1 to 1200                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                    | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• <i>IPv6 Neighbor Discovery Overview</i></li> <li>• <a href="#">show ipv6 neighbors on page 1672</a></li> </ul>                                                                                                                                            |

## negotiate-address

---

|                                 |                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | negotiate-address;                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet]                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For interfaces with PPP encapsulation, enable the interface to be assigned an IP address by the remote end.                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IPCP Options for Interfaces with PPP Encapsulation on page 193</a></li><li>• <a href="#">address on page 397</a></li><li>• <a href="#">unnumbered-address (PPP) on page 921</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul> |

## negotiation-options

---

|                                 |                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | negotiation-options {<br><a href="#">allow-remote-loopback</a> ;<br><a href="#">no-allow-link-events</a> ;<br>}                                                   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                     |
| <b>Description</b>              | Enable and disable IEEE 802.3ah Operation, Administration, and Management (OAM) features for Ethernet interfaces.<br><br>The statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.3ah OAM Link-Fault Management Overview</i></li></ul>                                                          |

## neighbor (Automatic Protection Switching for SONET/SDH)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>neighbor address;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>If you are configuring one router to be the working router and a second to be the protect router, configure the address of the remote interface. You configure this on one or both of the interfaces.</p> <p>The address you specify for the neighbor must never be routed through the interface on which APS is configured, or instability will result. We strongly recommend that you directly connect the working and protect routers and that you configure the interface address of this shared network as the neighbor address.</p> |
| <b>Options</b>                  | <i>address</i> —Neighbor's address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Basic Automatic Protect Switching</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## no-allow-link-events

|                                 |                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>no-allow-link-events;</code>                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> interface <i>interface-name</i> <a href="#">negotiation-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                            |
| <b>Description</b>              | Disable the sending of link event TLVs.                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Disabling the Sending of Link Event TLVs</i></li> </ul>                                                                      |

## no-aggregate-delegate-processing

---

|                                 |                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-aggregate-delegate-processing;                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet <a href="#">connectivity-fault-management</a> ]                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.1.                                                                   |
| <b>Description</b>              | Disable distribution of connectivity fault management (CFM) sessions on aggregated Ethernet interfaces.          |
| <b>Default</b>                  | CFM sessions on aggregated Ethernet interfaces are distributed by default.                                       |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1ag OAM Connectivity Fault Management Overview</i></li></ul> |

## asynchronous-notification

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (asynchronous-notification   no-asynchronous-notification);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> gigether-options ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>For all 10-Gigabit Ethernet interfaces, M120, M320, and T Series routers, configure support for notification of link down alarm generation and transfer.</p> <p>(MX Series routers, T Series routers) For all Gigabit Ethernet interfaces (1-Gigabit, 10-Gigabit, and 100-Gigabit), configure support for notification of link down alarm generation and transfer.</p> <p>(M120 and M320 routers) For all 10-Gigabit Ethernet PIC interfaces, configure support for notification of link down alarm generation and transfer.</p> <ul style="list-style-type: none"> <li>• <b>asynchronous-notification</b>—Support notification of link down alarm generation and transfer.</li> <li>• <b>no-asynchronous-notification</b>—Prohibit notification of link down alarm generation and transfer.</li> </ul> |
| <b>Default</b>                  | Support for notification of link down alarm generation and transfer is not enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Gigabit Ethernet Notification of Link Down Alarm Overview</i></li> <li>• <i>Configuring Gigabit Ethernet Notification of Link Down Alarm</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## no-auto-mdix

---

|                                 |                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-auto-mdix;                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interface ge-fpc/port/pic gigether-options]                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                             |
| <b>Description</b>              | <p>Disable the Auto MDI/MDIX feature.</p> <p>MX Series routers with Gigabit Ethernet interfaces automatically detect MDI and MDIX port connections. Use this statement to override the default setting. Remove this statement to return to the default setting.</p> |
| <b>Default</b>                  | Auto MDI/MDIX is enabled by default.                                                                                                                                                                                                                                |
| <b>Options</b>                  | There are no options for this statement.                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Interfaces Overview</i></li><li>• <a href="#">gigether-options on page 567</a>.</li></ul>                                                                                                                       |

## auto-negotiation

|                            |                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (auto-negotiation   no-auto-negotiation) <remote-fault (local-interface-online   local-interface-offline)>;                                                                                                                      |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ],<br>[edit interfaces <i>ge-pim</i> /0/0 <b>switch-options</b> <b>switch-port</b> <i>port-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.6.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                  |
| <b>Description</b>         | For Gigabit Ethernet interfaces on M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers explicitly enable autonegotiation and remote fault. For EX Series switches, explicitly enable autonegotiation only.  |

- **auto-negotiation**—Enables autonegotiation. This is the default.
- **no-auto-negotiation**—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure the link mode and speed.

When you configure Tri-Rate Ethernet copper interfaces to operate at 1 Gbps, autonegotiation must be enabled.



**NOTE:** On EX Series switches, an interface configuration that disables autonegotiation and manually sets the link speed to 1 Gbps is accepted when you commit the configuration; however, if the interface you are configuring is a Tri-Rate Ethernet copper interface, the configuration is ignored as invalid and autonegotiation is enabled by default.

To correct the invalid configuration and disable autonegotiation:

1. Delete the **no-auto-negotiation** statement and commit the configuration.
2. Set the link speed to 10 or 100 Mbps, set **no-auto-negotiation**, and commit the configuration.

On EX Series switches, if the link speed and duplex mode are also configured, the interfaces use the values configured as the desired values in the negotiation. If autonegotiation is disabled, the link speed and link mode must be configured.



**NOTE:** On T4000 routers, the **auto-negotiation** command is ignored for interfaces other than Gigabit Ethernet.

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | Autonegotiation is automatically enabled. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.                                                                                                                         |
| <b>Options</b>                  | <b>remote-fault (local-interface-online   local-interface-offline)</b> —(Optional) For M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers only, manually configure remote fault on an interface.<br><b>Default:</b> local-interface-online |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Gigabit Ethernet Autonegotiation Overview</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul>             |

---

## cbit-parity

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (cbit-parity   no-cbit-parity);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For T3 interfaces only, enable or disable C-bit parity mode, which controls the type of framing that is present on the transmitted T3 signal. When C-bit parity mode is enabled, the C-bit positions are used for the far-end block error (FEBC), far-end alarm and control (FEAC), terminal data link, path parity, and mode indicator bits, as defined in ANSI T1.107a-1989. For ATM and ATM2 IQ2 and IQ2-E interfaces, M23 framing is used when the <b>no-cbit-parity</b> statement is included. For all other interfaces, M13 framing is used when the <b>no-cbit-parity</b> statement is included. |
| <b>Default</b>                  | C-bit parity mode is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <i>Disabling T3 C-Bit Parity Mode</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |



---

## core-dump

---


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (core-dump   no-core-dump);                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces mo- <i>fpc/pic/port</i> multiservice-options]                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | <p>For monitoring services interfaces only, a useful tool for isolating the cause of a problem. Core dumping is enabled by default. The directory <b>/var/tmp</b> contains core files. The Junos OS saves the current core file (0) and the four previous core files, which are numbered 1 through 4 (from newest to oldest):</p> <ul style="list-style-type: none"><li>• <b>core-dump</b>—Enable the core dumping operation.</li><li>• <b>no-core-dump</b>—Disable the core dumping operation.</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                            |

## feac-loop-respond

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (feac-loop-respond   no-feac-loop-respond);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>For T3 interfaces only, configure the router so a remote CSU can place the local router into loopback.</p> <p>If you configure remote or local loopback with the T3 <b>loopback</b> statement, the router does not respond to FEAC requests from the CSU even if you include the <b>feac-loop-respond</b> statement in the configuration. For the router to respond, you must delete the <b>loopback</b> statement from the configuration.</p> <p>You must rollback the setting done on the remote CSU prior to deactivating the <b>feac-loop-respond</b> statement. If the remote CSU cannot comply, clear the remote loop through local configuration to achieve the cleanup. For example, configure remote loopback on the interface and then delete the remote loopback.</p> |
| <b>Default</b>                  | The router does not respond to FEAC requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the T3 FEAC Response</a></li><li>• <a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 658</a></li><li>• <a href="#">remote-loopback-respond on page 811</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## flow-control

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          | (flow-control   no-flow-control);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">multiservice-options</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                             | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 in EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | For aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, explicitly enable flow control, which regulates the flow of packets from the router or switch to the remote side of the connection. Enabling flow control is useful when the remote device is a Gigabit Ethernet switch. Flow control is not supported on the 4-port Fast Ethernet PIC.                                                                                                                                                                                  |
| <div style="display: flex; align-items: center;">  <div> <p><b>NOTE:</b> On the Type 5 FPC, to prioritize control packets in case of ingress oversubscription, you must ensure that the neighboring peers support MAC flow control. If the peers do not support MAC flow control, then you must disable flow control.</p> </div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         | Flow control is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                        | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• <i>Configuring Flow Control</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                |

## gratuitous-arp-reply

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (gratuitous-arp-reply   no-gratuitous-arp-reply);                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]<br>[edit interfaces <i>interface-range</i> <i>interface-range-name</i> ]       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | For Ethernet interfaces, enable updating of the Address Resolution Protocol (ARP) cache for gratuitous ARPs.            |
| <b>Default</b>                  | Updating of the ARP cache is disabled on all Ethernet interfaces.                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Interfaces Feature Guide for Security Devices</i></li></ul>                  |

## no-gratuitous-arp-request

---

|                                 |                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-gratuitous-arp-request;                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers. |
| <b>Description</b>              | For Ethernet interfaces and pseudowire logical interfaces, do not respond to gratuitous ARP requests.                                                          |
| <b>Default</b>                  | Gratuitous ARP responses are enabled on all Ethernet interfaces.                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Gratuitous ARP</i></li><li>• <a href="#">gratuitous-arp-reply on page 568</a></li></ul>                 |

## no-keepalives

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-keepalives;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | <p>Disable the sending of keepalives on a physical interface configured with PPP, Frame Relay, or Cisco HDLC encapsulation. The default keepalive interval is 10 seconds.</p> <p>For ATM2 IQ interfaces only, you can disable keepalives on a logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Keepalives on page 121</a></li> <li>• <i>Disabling the Sending of PPPoE Keepalive Messages</i></li> <li>• <i>Configuring Frame Relay Keepalives</i></li> </ul>                                                                                                                                                                                                                                                                                                                             |

## long-buildout

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (long-buildout   no-long-buildout);                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Configure the T3 line buildout. A T3 interface has two settings for the T3 line buildout: a short setting, which is less than 255 feet (68 meters), and a long setting, which is greater than 255 feet and shorter than 450 feet (137 meters).</p> <p>This statement applies to copper-cable-based T3 interfaces only. You cannot configure a line buildout for a DS3 channel on a channelized OC12 interface, which runs over fiber-optic cable.</p> |
| <b>Default</b>                  | A T3 interface uses the short line buildout setting ( <b>no-long-buildout</b> ) for wires shorter than 255 feet (68 meters).                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the T3 Line Buildout</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                |

## loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)

|                            |                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (loopback   no-loopback);                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>aggregated-ether-options</b> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <b>fastether-options</b> ],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                           |
| <b>Description</b>         | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.                                                                                                                                                                                                                |



### NOTE:

- By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.
- IPv6 Neighbor Discovery Protocol (NDP) addresses are not supported on Gigabit Ethernet interfaces when loopback mode is enabled on the interface. That is, if the loopback statement is configured at the [edit interfaces *ge-fpc/pic/port* gigether-options] hierarchy level, an NDP address cannot be configured at the [edit interfaces *ge-fpc/pic/port* unit *logical-unit-number* family inet6 address] hierarchy level.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Ethernet Loopback Capability</i></li> </ul>                     |

## mac-learn-enable

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mac-learn-enable;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <b>ethernet-switch-profile</b> ]<br>[edit interfaces aex aggregated-ether-options ethernet-switch-profile]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for statement under the [edit interfaces aex aggregated-ether-options <b>ethernet-switch-profile</b> ] hierarchy introduced in Junos OS Release 15.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), for Gigabit Ethernet DPCs on MX Series routers, for 100-Gigabit Ethernet Type 5 PIC with CFP, and for MPC3E, MPC4E, MPC5E, MPC5EQ, and MPC6E MPCs, configure dynamic learning of the source and destination MAC addresses. By default, the interface is not allowed to dynamically learn source and destination MAC addresses.</p> <p>To disable dynamic learning of the source and destination MAC addresses after it has been configured, you must delete <b>mac-learn-enable</b> from the configuration.</p> <p>MPCs support MAC address accounting for an individual interface or an aggregated Ethernet interface member link only after the interface has received traffic from the MAC source. If traffic is only exiting an interface, the MAC address is not learned and MAC address accounting does not occur.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering</i></li><li>• <i>Configuring MAC Address Accounting</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |




## no-partition

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-partition <b>interface-type</b> (e1   (cau4   so)   (ct3   t3)   so   t3);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces ce1-fpc/pic/port], [edit interfaces coc1-fpc/pic/port:channel], [edit interfaces coc12-fpc/pic/port], [edit interfaces cstm1-fpc/pic/port], [edit interfaces ct3-fpc/pic/port]</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>For Channelized E1 IQ PICs only, configure the channelized E1 interface as an unpartitioned, clear channel.</p> <p>For Channelized OC12 PIC only, convert the channelized OC1 IQ interface into a channelized T3 interface or a T3 interface. You perform this configuration task for C-bit parity and M13-mapped configurations.</p> <p>For Channelized OC12 IQ PICs only, configure the channelized OC12 interface as an unpartitioned, clear channel.</p> <p>For Channelized STM1 PIC only, convert the channelized STM1 IQ interface into a channelized Administrative Unit 4 (AU-4) interface or a SONET/SDH STM1 interface.</p> <p>For Channelized DS3 PIC only, configure the channelized T3 interface as an unpartitioned, clear channel.</p> |
| <b>Default</b>                  | If you do not include either this statement or the <b>partition</b> statement, the Channelized IQ PIC is not partitioned, and no data channels are configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p>The option used must correspond to the physical interface type:</p> <p><b>e1</b>—E1 interface type.</p> <p><b>coc12 so</b>—Channelized OC12 interface type, in SONET mode.</p> <p><b>cau4</b>—Channelized AU-4 interface type.</p> <p><b>cstm1</b>—SONET/SDH STM1 interface type, in SDH mode.</p> <p><b>ct3</b>—Channelized T3 interface type.</p> <p><b>t3</b>—T3 interface type.</p>                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Channelized E1 IQ and IQE Interfaces Overview</i></li> <li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li> <li>• <i>Configuring an OC12/STM4 Interface</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

- *Configuring Channelized STM1 IQ and IQE Interfaces*
- *Configuring T3 IQ Interfaces*
- [partition on page 749](#)
- *no-partition*

## payload-scrambler

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (payload-scrambler   no-payload-scrambler);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">t3-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Enable or disable HDLC scrambling on an E3, a SONET/SDH, or a T3 interface. This type of scrambling provides better link stability. Both sides of a connection must either use or not use scrambling.</p> <p>If you commit a T3 interface configuration that has HDLC payload scrambling enabled, the interface must also be configured to be compatible with the channel service unit (CSU) at the remote end of the line.</p> <p>Disable payload scrambling on an E3 interface if Digital Link compatibility mode is used.</p> <p>On a channelized OC12 interface, the <b>sonet payload-scrambler</b> statement is ignored. To configure scrambling on the DS3 channels on the interface, you can include the <b>t3-options payload-scrambler</b> statement in the configuration for each DS3 channel.</p> |
|                                 | <div>  <p><b>NOTE:</b> The <b>payload-scrambler</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">e3-options</a>] hierarchy level is not valid for IQE PICs.</p> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>                  | Payload scrambling is disabled on all E3 and T3 interfaces; it is enabled by default on E3/T3 over ATM interfaces and on SONET/SDH interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li> <li>• <i>Configuring E3 HDLC Payload Scrambling</i></li> <li>• <i>Configuring SONET/SDH HDLC Payload Scrambling for Link Stability</i></li> <li>• <i>Configuring T3 HDLC Payload Scrambling</i></li> <li>• <i>Examples: Configuring T3 Interfaces</i></li> <li>• <a href="#">compatibility-mode on page 457</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |

## no-pre-classifier

---

|                            |                                                                                                                                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | no-pre-classifier;                                                                                                                                                                                              |
| <b>Hierarchy Level</b>     | [edit chassis fpc <i>n</i> pic <i>n</i> ]                                                                                                                                                                       |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.4.                                                                                                                                                                  |
| <b>Description</b>         | Specify disabling the control queue for all ports on the 10-Gigabit Ethernet LAN/WAN PIC. Deleting this configuration re-enables the control queue feature on all ports of the 10-Gigabit Ethernet LAN/WAN PIC. |



**NOTE:** For the 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (model number PD-5-10XGE-SFPP), the control queue has a rate limiter to limit the control traffic to 2 Mbps (fixed, not user-configurable) per port. If the transit control traffic crosses this limit, then it can cause drops on locally terminating control traffic, causing flap of protocols such as BGP and OSPF. To avoid the control traffic being dropped, configure the **no-pre-classifier** statement to disable the control queue.

---

|                                 |                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | The <b>no-pre-classifier</b> statement is not configured and the control queue is operational.                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>10-port 10-Gigabit Ethernet LAN/WAN PIC Overview</li><li>Configuring Control Queue Disable on a 10-port 10-Gigabit Ethernet LAN/WAN PIC</li></ul> |

---

## no-redirects

---

|                                 |                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-redirects;                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                    |
| <b>Description</b>              | <p>Do not send protocol redirect messages on the interface.</p> <p>To disable the sending of protocol redirect messages for the entire router or switch, include the <b>no-redirects</b> statement at the [edit system] hierarchy level.</p> |
| <b>Default</b>                  | Interfaces send protocol redirect messages.                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Disabling the Transmission of Redirect Messages on an Interface on page 202</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>                           |

## source-filtering

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (source-filtering   no-source-filtering);                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and Gigabit Ethernet IQ interfaces only, enable the filtering of MAC source addresses, which blocks all incoming packets to that interface. To allow the interface to receive packets from specific MAC addresses, include the <b>source-address-filter</b> statement.</p> <p>If the remote Ethernet card is changed, the interface is no longer able to receive packets from the new card because it has a different MAC address.</p> |
| <b>Default</b>                  | Source address filtering is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering for Ethernet Interfaces</i></li><li>• <i>Configuring MAC Address Filtering on PTX Series Packet Transport Routers</i></li><li>• <a href="#">accept-source-mac on page 386</a></li><li>• <a href="#">source-address-filter on page 852</a></li></ul>                                                                                                                                                                    |

## syslog (Monitoring)

|                                 |                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (syslog   no-syslog);                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>mo-fpc/pic/port</i> <a href="#">multiservice-options</a> ]                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | <p>System logging is enabled by default. The system log information of the Monitoring Services PIC is passed to the kernel for logging in the <code>/var/log</code> directory.</p> <ul style="list-style-type: none"> <li>• <b>syslog</b>—Enable PIC system logging.</li> <li>• <b>no-syslog</b>—Disable PIC system logging.</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                       |

## no-termination-request

|                                 |                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-termination-request;                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | <p>[edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">ppp-options</a>],</p> <p>[edit <a href="#">interfaces</a> <i>lsq-fpc/pic/port</i> <a href="#">lsq-failure-options</a>]</p>                                                                                                                                                                                           |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Support at the [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">ppp-options</a>] hierarchy level added in Junos OS Release 8.3.</p>                                                                                                                                                                              |
| <b>Description</b>              | For LSQ PICs or link PICs in redundant LSQ configurations, you can inhibit the router from sending PPP termination-request messages to the remote host if the PIC fails.                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Link PIC Failover on Channelized OC3 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Link PIC Failover on Channelized OC12/STM4 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Link PIC Failover on Channelized STM1 Interfaces</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## translate-discard-eligible

---

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (translate-discard-eligible   no-translate-discard-eligible);                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                |
| <b>Description</b>              | For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay discard eligible (DE) control bits.                                                                                                                         |
| <b>Default</b>                  | DE bit translation is disabled.                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Frame Relay Control Bit Translation</i></li></ul>                                                                                                                                                         |

## translate-fecn-and-becn

---

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (translate-fecn-and-becn   no-translate-fecn-and-becn);                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                |
| <b>Description</b>              | For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay forward explicit congestion notification (FECN) control bits and Frame Relay backward explicit congestion notification (BECN) control bits.                 |
| <b>Default</b>                  | FECN and BECN bit translation is disabled.                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Frame Relay Control Bit Translation</i></li></ul>                                                                                                                                                         |



## unframed

---

|                                 |                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (unframed   no-unframed);                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ]                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                             |
| <b>Description</b>              | For E3 IQ interfaces only, enable or disable unframed mode. In unframed mode, the E3 IQ interface do not detect yellow ( <b>ylw</b> ) or loss-of-frame ( <b>lof</b> ) alarms. |
| <b>Default</b>                  | Unframed mode is disabled.                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E3 IQ and IQE Unframed Mode</i></li> </ul>                                                                            |

## z0-increment

---

|                                 |                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (z0-increment   no-z0-increment);                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                   |
| <b>Description</b>              | Configure an incremental STM ID rather than a static one.                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Incrementing STM ID to Interoperate with Older Equipment in SDH Mode</i></li> <li>• <a href="#">sonet-options on page 849</a></li> </ul> |

## node-id

---

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | node-id <i>mac-address</i> ;                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring ring-name</a> ]                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>For EX Series switches and QFX Series switches, node-id is not configurable.</p> <p>For MX Series routers, optionally specify the MAC address of a node in the protection group. If this statement is not included, the router assigns the node's MAC address.</p>                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li></ul> |

## non-revertive (Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | non-revertive;                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces aeX aggregated-ether-options lacp link-protection]                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                                                                                                                                             |
| <b>Description</b>              | Disable the ability to switch to a better priority link (if one is available) once a link is established as active and collection distribution is enabled.                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">link-protection on page 643</a></li><li>• <i>Configuring Aggregated Ethernet Link Protection</i></li><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul> |

## oam

```

Syntax oam {
 ethernet {
 connectivity-fault-management {
 action-profile profile-name {
 default-actions {
 interface-down;
 }
 }
 }
 performance-monitoring {
 delegate-server-processing;
 hardware-assisted-timestamping;
 sla-iterator-profiles {
 profile-name {
 avg-fd-twoway-threshold;
 avg-ifdv-twoway-threshold;
 avg-flr-forward-threshold;
 avg-flr-backward-threshold;
 disable;
 calculation-weight {
 delay delay-weight;
 delay-variation delay-variation-weight;
 }
 cycle-time milliseconds;
 iteration-period connections;
 measurement-type (loss | statistical-frame-loss | two-way-delay);
 }
 }
 }
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {
 level number;
 name-format (character-string | none | dns | mac+2octet);
 maintenance-association ma-name {
 short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
 protect-maintenance-association protect-ma-name;
 remote-maintenance-association remote-ma-name;
 continuity-check {
 convey-loss-threshold;
 hold-interval minutes;
 interface-status-tlv;
 interval (100ms | 10m | 10ms | 10s | 1m | 1s);
 loss-threshold number;
 port-status-tlv;
 }
 mep mep-id {
 auto-discovery;
 direction (up | down);
 interface interface-name (protect | working);
 }
 }
 }
 }

```

```

lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
rem-err-xcon | xcon);
priority number;
remote-mep mep-id {
 action-profile profile-name;
 sla-iterator-profile profile-name {
 data-tlv-size size;
 iteration-count count-value;
 priority priority-value;
 }
}
}
}
}
}
link-fault-management {
 action-profile profile-name {
 action {
 link-down;
 send-critical-event;
 syslog;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 protocol-down;
 }
 }
}
interface interface-name {
 apply-action-profile
 link-discovery (active | passive);
 loopback-tracking;
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
}
}
}
}
}

```

|                                 |                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit protocols]                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                                               |
| <b>Description</b>              | For Ethernet interfaces on M320, M120, MX Series, and T Series routers and PTX Series Packet Transport Routers, provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) support.<br><br>The remaining statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.3ah OAM Link-Fault Management Overview</i></li><li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li></ul>                                                        |

## oam-liveness

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>oam-liveness {<br/>    down-count cells;<br/>    up-count cells;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>],<br/>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i><br/>    multipoint-destination <i>address</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br/>    family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</pre> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the <b>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>]</b> hierarchy level.</p>                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>down-count cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells lost before a VC is declared down.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p> <p><b>up-count cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells received before a VC is declared up.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p>                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring the ATM OAM F5 Loopback Cell Threshold</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## oam-period

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>oam-period (disable   seconds);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>],<br/>         [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>         [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>For ATM encapsulation only, configure the OAM F5 loopback cell period. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure the OAM F4 loopback cell period at the [edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>] hierarchy level.</p>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>                  | If you omit this statement, OAM F5 loopback cells are not initiated, but the interface still responds if it receives OAM F5 loopback cells.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>disable</b>—Disable the OAM loopback cell transmit feature.</p> <p><b>seconds</b>—OAM loopback cell period.</p> <p><b>Range:</b> 1 through 900 seconds</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Defining the ATM OAM F5 Loopback Cell Period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## oc-slice

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>oc-slice <i>oc-slice-range</i>;</code>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> ]                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For channelized OC12 IQ interfaces only, configure the range of SONET/SDH slices.                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>                  | If you do not include either this statement or the <b>no-partition</b> statement, the Channelized OC12 IQ PICs not partitioned, and no data channels are configured.                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>oc-slice-range</b>—Range of SONET/SDH slices. OC3 interfaces must occupy three consecutive OC slices per interface, in the form 1–3, 4–6, 7–9, or 10–12. The T3, T1, and DS0 interface types each occupy one OC slice per interface.</p> <p><b>Range:</b> For OC3 interfaces, 1–3, 4–6, 7–9, or 10–12; for SONET/SDH and T3 interfaces, 1–12</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li></ul>                                                                                                                                                                                                                                                                                                  |

## open-timeout

---

|                                 |                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>open-timeout <i>seconds</i>;</code>                                                                                    |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>services-options</b> ]                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                            |
| <b>Description</b>              | Configure timeout period for Transmission Control Protocol (TCP) session establishment.                                      |
| <b>Options</b>                  | <p><b>seconds</b>—Timeout period in seconds.</p> <p><b>Range:</b> 4 through 224 seconds</p> <p><b>Default:</b> 5 seconds</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>            |




## optics-options

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> <b>optics-options</b> {   <b>alarm</b> low-light-alarm {     (link-down   syslog);   }   tca <i>tca-identifier</i> (enable-tca   no-enable-tca) (threshold <i>number</i>   threshold-24hrs <i>number</i>);   tx-power <i>dbm</i>;   <b>warning</b> low-light-warning {     (link-down   syslog);   }   <b>wavelength</b> <i>nm</i>; } </pre>                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p><b>alarm</b> option and <b>warning</b> options introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p> <p>Statement and <b>tx-power</b> option introduced in Junos OS Release 13.2 for PTX Series routers.</p> <p><b>tca</b> option introduced in Junos OS Release 14.2 for PTX Series routers.</p> |
| <b>Description</b>              | For 10-Gigabit Ethernet or 100-Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces only, configure full C-band International Telecommunication Union (ITU)-Grid tunable optics.                                                                                                                                                                                                                         |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Ethernet DWDM Interface Wavelength Overview</i></li> <li><i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li> </ul>                                                                                                                                                                                                                                                  |

## option-82

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Options <b>circuit-id</b> and <b>remote-id</b> introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Specify that the option 82 information from the client PDU is concatenated with the username during the subscriber authentication process.</p> <p>For autosense VLANs, you can additionally specify Option 82 suboption information that is concatenated with the username. You can specify either both or neither of the Agent Circuit ID (suboption 1) and Agent Remote ID (suboption 1). If you specify both, the Agent Circuit ID is supplied first, followed by a delimiter, and then the Agent Remote ID. If you specify that neither suboption is supplied, the raw payload of Option 82 from the PDU is concatenated to the username.</p> <div><b>NOTE:</b> The option 82 value used in creating the username is based on the option 82 value that is encoded in the incoming DHCP discover packet. The use of suboptions is supported for DHCPv4 only.</div> |
| <b>Options</b>                  | <p><b>none</b>—Use the raw payload of Option 82 from the PDU.</p> <p><b>circuit-id</b>—(Optional) Use the Agent Circuit ID suboption (suboption 1).</p> <p><b>remote-id</b>—(Optional) Use the Agent Remote ID suboption (suboption 2).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li><li>• <i>Using DHCP Option 82 Suboptions in Authentication Usernames for Autosense VLANs</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## otn-options

**Syntax** `otn-options` {

```

 bytes (otn-options) transmit-payload-type value;
 fec (efec | gfec | gfec-sdfec | none);
 (is-ma | no-is-ma);
 (laser-enable | no-laser-enable);
 (line-loopback | no-line-loopback);
 (local-loopback | no-local-loopback);
 (odu-ttim-action-enable | no-odu-ttim-action-enable);
 (otu-ttim-action-enable | no-otu-ttim-action-enable);
 odu-delay-management {
 (bypass | no-bypass);
 (monitor-end-point | no-monitor-end-point);
 number-of-frames value;
 (no-start-measurement | start-measurement);
 }
 odu-signal-degrade {
 ber-threshold-clear value;
 ber-threshold-signal-degrade value;
 interval value;
 }
 (prbs | no-prbs);
 preemptive-fast-reroute {
 (backward-frr-enable | no-backward-frr-enable);
 (signal-degrade-monitor-enable | no-signal-degrade-monitor-enable);
 odu-backward-frr-enable | no-odu-backward-frr-enable;
 odu-signal-degrade-monitor-enable | no-odu-signal-degrade-monitor-enable;
 }
 rate {
 (fixed-stuff-bytes | no-fixed-stuff-bytes);
 oc192;
 otu4;
 (pass-through | no-pass-through);
 }
 signal-degrade {
 ber-threshold-clear value;
 ber-threshold-signal-degrade value;
 interval value;
 }
 tca tca-identifier (enable-tca | no-enable-tca) (threshold number | threshold-24hrs number);
 transport-monitoring;
 trigger trigger-identifier;
 tti tti-identifier;
}

```

**Hierarchy Level** [edit interfaces *ge-fpc/pic/port*]  
 [edit interfaces *xe-fpc/pic/port*]  
 [edit interfaces *et-fpc/pic/port*]

**Release Information** Statement introduced in Junos OS Release 9.4.  
**bytes**, **is-ma**, **local-loopback**, **no-is-ma**, **no-local-loopback**, **no-odu-ttim-action-enable**,  
**no-otu-ttim-action-enable**, **no-prbs**, **odu-delay-management**, **odu-ttim-action-enable**,

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p><b>otu-ttim-action-enable</b>, <b>prbs</b>, <b>preemptive-fast-reroute</b>, and <b>signal-degrade</b> statements introduced in Junos OS Release 13.2 for PTX Series routers.</p> <p><b>oc192</b> statement introduced in Junos OS Release 13.3R3 for MX Series routers.</p> <p><b>odu-signal-degrade</b>, <b>odu-backward-frr-enable   no-odu-backward-frr-enable</b>, <b>odu-signal-degrade-monitor-enable   no-odu-signal-degrade-monitor-enable</b> statements introduced in Junos OS Release 14.1R2 and 14.2 for P2-100GE-OTN PIC in PTX5000 routers.</p> <p><b>tca</b> option introduced in Junos OS Release 14.2 for PTX Series routers.</p> |
| <b>Description</b>              | Specify the Ethernet optical transport network (OTN) interface and options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interfaces—To view this statement in the configuration.<br>interfaces-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>10-Gigabit Ethernet OTN Options Configuration Overview</i></li><li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li><li>• <i>Configuring 100-Gigabit DWDM OTN PICs</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       |

---

## output

|                                 |                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>output {<br/>  <b>service-set</b> <i>service-set-name</i> <b>&lt;service-filter filter-name&gt;</b>;<br/>}</pre>                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                         |
| <b>Description</b>              | Define one or more output service sets and filters to be applied to traffic.                                                                                                                                                                                              |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                         |

## output-list

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>output-list [ <i>filter-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>filter</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>filter</b> ]                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Apply a group of filters to evaluate when packets are transmitted on an interface.                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | [ <i>filter-names</i> ]—Name of a filter to evaluate when packets are transmitted on the interface. Up to 16 filters can be included in a filter input list.                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying a Filter to an Interface on page 212</a></li> <li>• <a href="#">input-list on page 597</a></li> <li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul> |

## output-policer

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>output-policer <i>policer-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [ <code>edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a></code> ]                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Apply a single-rate two-color policer to the Layer 2 output traffic at the logical interface. The <b>output-policer</b> and <b>output-three-color</b> statements are mutually exclusive.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <b><i>policer-name</i></b> —Name of the single-rate two-color policer that you define at the [ <code>edit firewall</code> ] hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Usage Guidelines</b>         | See <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <a href="#">input-policer on page 598</a></li><li>• <a href="#">input-three-color on page 600</a></li><li>• <a href="#">layer2-policer on page 631</a></li><li>• <a href="#">logical-interface-policer on page 655</a></li><li>• <a href="#">output-three-color on page 742</a></li></ul> |

## output-priority-map

|                                 |                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> output-priority-map {   classifier {     premium {       forwarding-class <i>class-name</i> {         loss-priority (high   low);       }     }   } } </pre>                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> together-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a>]</p> <p>[edit interfaces <i>interface-name</i> ether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 13.2 for the QFX Series.</p>                                                                                                                                                              |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the output policer priority map to be applied to outgoing frames on this interface.</p> <p>The statements are explained separately.</p>                                                                             |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Output Priority Map</i></li> <li>• <a href="#">input-priority-map on page 599</a></li> </ul>                                                                                                                                         |

## output-three-color

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>output-three-color <i>policer-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Apply a single-rate or two-rate three-color policer to the Layer 2 output traffic at the logical interface. The <b>output-three-color</b> and <b>output-policer</b> statements are mutually exclusive.                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <i>policer-name</i> —Name of the single-rate or two-rate three-color policer.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <a href="#">input-three-color on page 600</a></li><li>• <a href="#">input-policer on page 598</a></li><li>• <a href="#">layer2-policer on page 631</a></li><li>• <a href="#">logical-interface-policer on page 655</a></li><li>• <a href="#">output-policer on page 740</a></li></ul> |



## output-vlan-map (Aggregated Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>output-vlan-map {   (pop   push   swap);   tag-protocol-id <i>tpid</i>;   vlan-id <i>number</i>; }</pre>                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</pre>                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For aggregated Ethernet interfaces using Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite profile to be applied to outgoing frames on this logical interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags</i></li> <li>• <a href="#">input-vlan-map (Aggregated Ethernet) on page 601</a></li> </ul>                                                                                                                     |

## output-vlan-map (Gigabit Ethernet IQ and 10-Gigabit Ethernet with SFPP)

---

|                                 |                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>output-vlan-map {<br/>    (pop   pop-pop   pop-swap   push   push-push   swap   swap-push   swap-swap);<br/>    inner-tag-protocol-id <i>tpid</i>;<br/>    inner-vlan-id <i>number</i>;<br/>    tag-protocol-id <i>tpid</i>;<br/>    vlan-id <i>number</i>;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ]                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>pop-pop</b> , <b>pop-swap</b> , <b>push-push</b> , <b>swap-push</b> , and <b>swap-swap</b> statements added in Junos OS Release 8.1.                                                                                 |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Port 10-Gigabit Ethernet SFPP interfaces only, define the rewrite operation to be applied to outgoing frames on this logical interface.<br><br>The statements are explained separately.                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags</i></li><li>• <a href="#">input-vlan-map on page 602</a></li></ul>                                                                                                              |

## overflow (Receive Bucket)

---

|                                 |                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>overflow (discard   tag);</pre>                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">receive-bucket</a> ]                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                               |
| <b>Description</b>              | Specify how to handle packets that exceed the threshold for the receive leaky bucket.                                                                                           |
| <b>Options</b>                  | <b>tag</b> —Tag, count, and process received packets that exceed the threshold.<br><br><b>discard</b> —Discard received packets that exceed the threshold. No counting is done. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li></ul>             |

## overflow (Transmit Bucket)

|                                 |                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | overflow discard;                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>transmit-bucket</b> ]                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                     |
| <b>Description</b>              | Discard packets that exceed the threshold for the transmit leaky bucket.                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li> </ul> |

## override

|                                 |                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | override tag <i>vlan-tag</i> dynamic-profile <i>profile name</i> ;                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>auto-configure vlan-ranges</b> ],<br>[edit interfaces <i>interface-name</i> <b>auto-configure stacked-vlan-ranges</b> ]                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Override dynamic profile assignment to individual VLANs that are already part of a previously defined VLAN range and dynamic profile.                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>vlan-tag</b>—VLAN tag that you want to override.</p> <p><b>profile-name</b>—Name of the dynamic profile that you want to use when overriding the specified VLAN tag.</p>                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Overriding the Dynamic Profile Used for an Individual VLAN</i></li> <li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs</i></li> <li>• <i>Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs</i></li> </ul> |

## pado-advertise

---

|                            |                                                                                                                                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | pado-advertise;                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>     | [edit protocols pppoe]                                                                                                                                                                                          |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                  |
| <b>Description</b>         | Enable named services configured in PPPoE service name tables to be advertised in PPPoE Active Discovery Offer (PADO) control packets. By default, advertisement of named services in PADO packets is disabled. |



**NOTE:** If you enable advertisement of named services in PADO packets, make sure the number and length of all advertised service entries does not exceed the maximum transmission unit (MTU) size of the PPPoE underlying interface.


|                                 |                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li><li>• <i>Enabling Advertisement of Named Services in PADO Control Packets</i></li></ul> |

## paired-group

---

|                                 |                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | paired-group <i>group-name</i> ;                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                           |
| <b>Description</b>              | Configure load sharing between two working protect circuit pairs.                                                                           |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name, as configured with the <b>protect-circuit</b> or <b>working-circuit</b> statement.                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring APS Load Sharing</i></li><li>• <a href="#">working-circuit on page 954</a></li></ul> |

## pap

|                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                               | <pre>pap {     access-profile <i>name</i>;     default-pap-password <i>password</i>;     local-name <i>name</i>;     local-password <i>password</i>;     passive; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                      | <pre>[edit interfaces <i>interface-name</i> <b>ppp-options</b>], [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options</b>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options</b>]</pre>                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                  | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                          | <p>Configure the Password Authentication Protocol (PAP). Use PAP authentication as a means to provide a simple method for the peer to establish its identity using a two-way handshake. This is done only upon initial link establishment.</p> <p>After the link is established, an ID and password pair is repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.</p>                                                                                                                                                             |
| <div>  <p><b>BEST PRACTICE:</b> On inline service (si) interfaces for L2TP, only the <b>pap</b> statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.</p> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| The remaining statements are explained separately.                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                             | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 123</a></li> <li>• <a href="#">Configuring the PPP Password Authentication Protocol On a Logical Interface on page 176</a></li> <li>• <a href="#">Tracing Operations of the pppd Process on page 133</a></li> <li>• <a href="#">traceoptions (PPP Process) on page 890</a></li> <li>• <a href="#">Example: Configuring PAP for an L2TP Profile</a></li> <li>• <a href="#">Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface</a></li> </ul> |

## pap-password

---

|                            |                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>pap-password password;</code>                                                                                       |
| <b>Hierarchy Level</b>     | [edit access profile <i>profile-name</i> client <i>client-name</i> ]                                                      |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches. |
| <b>Description</b>         | Configure the Password Authentication Protocol (PAP) password.                                                            |



**NOTE:** This statement is not supported for L2TP LNS on MX Series routers.

---

|                                 |                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <code>password</code> —PAP password.                                                                            |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the PAP Password for an L2TP Profile</i></li></ul>       |

## partition

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>partition <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> <b>interface-type</b> <i>type</i> <b>timeslots</b> <i>time-slot-range</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | The partition number is correlated with the channel number. Partition and channel numbering on IQ interfaces begins with :1, not :0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>                  | If you omit this statement, the channelized PIC or PIM is not partitioned, and no data channels are configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b><i>partition-number</i></b>—Sublevel interface partition index.</p> <p><b>Range:</b></p> <ul style="list-style-type: none"> <li>• 1 through 4 for an OC3 interface on a channelized OC12 IQ interface.</li> <li>• 1 through 12 for a T3 interface on a channelized OC12 IQ interface.</li> <li>• 1 through 4 for a T3 interface on a channelized T3 IQ interface.</li> <li>• 1 through 28 for a T1 IQ interface on a channelized OC12 IQ or channelized T3 IQ interface.</li> <li>• 1 through 10 for an E1 interface on a channelized E1 IQ interface.</li> <li>• 1 through 30 on a channelized E1 interface.</li> <li>• 1 through 23 on a channelized T1 interface.</li> <li>• 1 through 24 for NxDS0 interfaces on either channelized OC12 IQ or channelized DS3 IQ interfaces.</li> <li>• 0 through 31 (with 0 reserved for framing) for NxDS0 interfaces on channelized E1 IQ interfaces.</li> </ul> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Channelized E1 IQ and IQE Interfaces Overview</i></li> <li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li> <li>• <i>Configuring Channelized T3 IQ Interfaces</i></li> <li>• <a href="#">no-partition on page 719</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## passive (CHAP)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>passive;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <code>ppp-options chap</code> ],<br>[edit interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options chap</code> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options chap</code> ]                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Do not challenge the peer, but respond if challenged. If you omit this statement from the configuration, the interface always challenges its peer.</p> <p>For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <code>atm-ppp-llc</code>—PPP over AAL5 LLC encapsulation.</li><li>• <code>atm-ppp-vc-mux</code>—PPP over AAL5 multiplex encapsulation.</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Passive Mode on page 123</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                    |

## passive (PAP)

---

|                                 |                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>passive;</code>                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <code>ppp-options pap</code> ],<br>[edit interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options pap</code> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options pap</code> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Initiate an authentication request when the PAP option is received from a peer. If you omit this statement from the configuration, the interface requires the peer to initiate an authentication request.                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Passive Mode on page 126</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>                                                                                                                                            |



## passive-monitor-mode

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>passive-monitor-mode;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i>]</code>                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Monitor packet flows from another router. If you include this statement in the configuration, the interface does not send keepalives or alarms, and does not participate actively on the network.</p> <p>This statement is supported on ATM, Ethernet, and SONET/SDH interfaces. For more information, see <i>ATM Interfaces Feature Guide for Routing Devices</i>.</p> <p>For ATM and Ethernet interfaces, you can include this statement on the physical interface only.</p> <p>For SONET/SDH interfaces, you can include this statement on the logical interface only.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Enabling Passive Monitoring on ATM Interfaces</i></li> <li>• <i>Passive Monitoring on Ethernet Interfaces Overview</i></li> <li>• <i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i></li> <li>• <a href="#">multiservice-options on page 695</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                   |

## password (Interfaces)

---

|                                 |                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>password password-string;</code>                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                    |
| <b>Description</b>              | Configure the password that is sent to the external AAA authentication server for subscriber VLAN or stacked VLAN interface authentication.                                                                       |
| <b>Options</b>                  | <i>password-string</i> —Authentication password.                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an Authentication Password for VLAN or Stacked VLAN Ranges</a></li></ul>                                                                          |

## path-database-size

---


|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>path-database-size path-database-size;</code>                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management linktrace</a> ]                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                           |
| <b>Description</b>              | Number of linktrace reply entries to be stored per linktrace request.                                                   |
| <b>Options</b>                  | <i>path-database-size</i> —Database size.<br><b>Range:</b> 1 through 255<br><b>Default:</b> 64                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Linktrace Protocol in CFM</a></li></ul>                 |

## path-trace

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>path-trace <i>trace-string</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For SONET/SDH interfaces and 10-Gigabit Ethernet interfaces in WAN PHY mode, configure a path trace identifier, which is a text string that identifies the circuit.</p> <p>On SONET/SDH OC48 interfaces that are configured for channelized (multiplexed) mode (by including the <b>no-concatenate</b> statement at the [edit chassis fpc slot-number pic pic-number] hierarchy level), the <b>bytes e1-quiet</b> and <b>bytes f1</b> options have no effect. The <b>bytes f2</b>, <b>bytes z3</b>, <b>bytes z4</b>, and <b>path-trace</b> options work correctly on channel 0 and work in the transmit direction only on channels 1, 2, and 3.</p> <p>For DS3 channels on a channelized OC12 interface, you can configure a unique path trace for each of the 12 channels. Each path trace can be up to 16 bytes. For channels on a channelized OC12 IQ interface, each path trace can be up to 64 bytes.</p> |
| <b>Options</b>                  | <p><b>trace-string</b>—Text string that identifies the circuit. If the string contains spaces, enclose it in quotation marks. A common convention is to use the circuit identifier as the path trace identifier. If you do not configure an identifier, the Junos OS uses the system and interface names to construct the default <b>trace-string</b>. For all nonchannelized SONET/SDH interfaces, the default <b>trace-string</b> is <b>system-name interface-name</b>. For channelized SONET/SDH interfaces and 10-Gigabit Ethernet WAN-PHY interfaces, the default <b>trace-string</b> is <b>interface-name</b>.</p>                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the SONET/SDH Path Trace Identifier for a Circuit</i></li> <li>• <a href="#">sonet-options on page 849</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## payload-scrambler

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (payload-scrambler   no-payload-scrambler);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">t3-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Enable or disable HDLC scrambling on an E3, a SONET/SDH, or a T3 interface. This type of scrambling provides better link stability. Both sides of a connection must either use or not use scrambling.</p> <p>If you commit a T3 interface configuration that has HDLC payload scrambling enabled, the interface must also be configured to be compatible with the channel service unit (CSU) at the remote end of the line.</p> <p>Disable payload scrambling on an E3 interface if Digital Link compatibility mode is used.</p> <p>On a channelized OC12 interface, the <b>sonet payload-scrambler</b> statement is ignored. To configure scrambling on the DS3 channels on the interface, you can include the <b>t3-options payload-scrambler</b> statement in the configuration for each DS3 channel.</p> |
|                                 | <div> <b>NOTE:</b> The <b>payload-scrambler</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">e3-options</a>] hierarchy level is not valid for IQE PICs.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>                  | Payload scrambling is disabled on all E3 and T3 interfaces; it is enabled by default on E3/T3 over ATM interfaces and on SONET/SDH interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <i>Configuring E3 HDLC Payload Scrambling</i></li><li>• <i>Configuring SONET/SDH HDLC Payload Scrambling for Link Stability</i></li><li>• <i>Configuring T3 HDLC Payload Scrambling</i></li><li>• <i>Examples: Configuring T3 Interfaces</i></li><li>• <a href="#">compatibility-mode on page 457</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |

## payload-size

---

|                                 |                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>payload-size bytes ;</code>                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> satop-options]                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                  |
| <b>Description</b>              | Specify the <b>satop-options</b> payload size in integer number of bytes.                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM Support on Circuit Emulation PICs Overview</i></li> <li>• <a href="#">satop-options on page 829</a></li> </ul> |

## pdu-interval

---

|                                 |                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pdu-interval interval;</code>                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management interface</a> <i>interface-name</i> ]                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                    |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the periodic OAM PDU sending interval for fault detection. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. |
| <b>Options</b>                  | <p><b>interval</b>—Periodic OAM PDU sending interval.</p> <p><b>Range:</b> 100 through 1000 milliseconds</p> <p><b>Default:</b> 1000 milliseconds</p>                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the OAM PDU Interval</i></li> </ul>                                                                                                                                                      |

## pdu-threshold

---

|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pdu-threshold <i>threshold-value</i>;</code>                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                   |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the number of OAM PDUs to miss before an error is logged. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. |
| <b>Options</b>                  | <b><i>threshold-value</i></b> —The number of PDUs missed before declaring the peer lost.<br><b>Range:</b> 3 through 10 PDUs<br><b>Default:</b> 3 PDUs                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the OAM PDU Threshold</i></li></ul>                                                                                                                                                      |

## peer

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>peer <i>a.b.c.d</i> {<br/>    interface <i>interface-name</i>;<br/>}</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>multi-chassis-protection</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | For MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces, use the <b>multi-chassis-protection</b> statement under the physical interface level to reduce the configuration at the logical interface level. If the interchassis control protocol connection (ICCP) is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer active-active node specified by the <b>peer</b> statement. You must also specify the peer's physical interface. |
| <b>Options</b>                  | <p><b><i>a.b.c.d</i></b>—Specify the IP address of the peer.</p> <p><b>interface <i>interface-name</i></b>—Specify the peer's physical interface: interface <i>interface-name-fpc/pic/port</i></p>                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Multichassis Link Aggregation on MX Series Routers</i></li> <li>• <i>Configuring Active-Active Bridging and VRRP over IRB in Multichassis Link Aggregation</i></li> <li>• <i>Configuring Aggregated Ethernet Link Protection</i></li> <li>• <i>Example: Configuring Aggregated Ethernet Link Protection</i></li> <li>• <a href="#">multi-chassis-protection on page 689</a></li> </ul>                                                                                                        |

## peer-unit

---

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>peer-unit <i>unit-number</i>;</code>                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | Configure a peer relationship between two logical systems.                                                                                                                                                     |
| <b>Options</b>                  | <i>unit-number</i> —Peering logical system unit number.                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                              |



## per-unit-scheduler

|                            |                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>per-unit-scheduler;</code>                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 13.2 on 16x10GE MPC and MPC3E line cards.</p> <p>Statement introduced in Junos OS Release 13.2 on PTX Series Packet Transport Routers.</p> <p>Statement introduced in Junos OS Release 13.3 on MPC4E line cards.</p> <p>Statement introduced in Junos OS Release 15.1 on MPC6E line cards.</p> |
| <b>Description</b>         | <p>For Channelized OC3 IQ, Channelized OC12 IQ, Channelized STM1 IQ, Channelized T3 IQ, Channelized E1 IQ, E3 IQ, link services IQ interfaces (lsq-), Gigabit Ethernet IQ, Gigabit Ethernet IQ2 and IQ2-E, and 10-, 40-, and 100-Gigabit Ethernet interfaces (including the 16x10GE MPC), enable the association of scheduler map names with logical interfaces.</p>                                |



**CAUTION:** Turning on per-unit scheduling causes the interface to reinitialize, which means all logical interfaces (units) on the interface are deleted and recreated.



**NOTE:** To enable per-unit scheduling on MX104 routers, configure the `per-unit-scheduler` statement at each member physical interface level of a particular aggregated Ethernet interface as well as at that aggregated Ethernet interface level. On other routing platforms, it is enough if you include this statement at the aggregated Ethernet interface level.



**NOTE:** Per-unit scheduling is not supported on T1 interfaces configured on the Channelized OC12 IQ PIC.



**NOTE:** On Gigabit Ethernet IQ2 and IQ2-E PICs without the `per-unit-scheduler` statement, the entire PIC supports 4071 VLANs and the user can configure all the VLANs on the same port.

On Gigabit Ethernet IQ2 and IQ2-E PICs with the `per-unit-scheduler` statement, the entire PIC supports  $1024 - 2 * \text{number of ports}$  (1024 minus two times the number of ports), because each port is allocated two default schedulers.

When including the **per-unit-scheduler** statement, you must also include the **vlan-tagging** statement or the **flexible-vlan-tagging** statement (to apply scheduling to VLANs) or the **encapsulation frame-relay** statement (to apply scheduling to DLCIs) at the **[edit interfaces interface-name]** hierarchy level.

|                                 |                                                                            |
|---------------------------------|----------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.                     |
|                                 | interface-control—To add this statement to the configuration.              |
| <b>Related Documentation</b>    | • <i>Applying Scheduler Maps and Shaping Rate to DLCIs and VLANs</i>       |
|                                 | • <a href="#">vlan-tagging on page 940</a>                                 |
|                                 | • <a href="#">flexible-vlan-tagging on page 555</a>                        |
|                                 | • <i>Example: Applying Scheduling and Shaping to VLANs</i>                 |
|                                 | • <i>Configuring Virtual LAN Queuing and Shaping on PTX Series Routers</i> |

## performance-monitoring

```
Syntax performance-monitoring {
 delegate-server-processing;
 hardware-assisted-timestamping;
 sla-iterator-profiles {
 profile-name {
 avg-fd-twoway-threshold;
 avg-ifdv-twoway-threshold;
 avg-flr-forward-threshold;
 avg-flr-backward-threshold;
 disable;
 calculation-weight {
 delay delay-weight;
 delay-variation delay-variation-weight;
 }
 cycle-time milliseconds;
 iteration-period connections;
 measurement-type (loss | statistical-frame-loss | two-way-delay);
 }
 }
}
```

**Hierarchy Level** [edit protocols [oam ethernet connectivity-fault-management](#)]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** Specify performance monitoring support for Ethernet frame delay measurement.

The remaining statements are explained separately.

**Required Privilege Level** Configure—To enter configuration mode.  
Control—To modify any configuration.

**Related Documentation**

- *Ethernet Frame Delay Measurements Overview*
- *Guidelines for Configuring Routers to Support an ETH-DM Session*
- *Enabling the Hardware-Assisted Timestamping Option*

## periodic

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>periodic interval;</code>                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces aex <a href="#">aggregated-ether-options lacp</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options lacp</a> ]                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                         |
| <b>Description</b>              | For aggregated Ethernet interfaces only, configure the interval for periodic transmission of LACP packets.                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <i>interval</i> —Interval for periodic transmission of LACP packets. <ul style="list-style-type: none"><li>• <b>fast</b>—Transmit packets every second.</li><li>• <b>slow</b>—Transmit packets every 30 seconds.</li></ul> <b>Default:</b> <b>fast</b>                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring LACP for Aggregated Ethernet Interfaces</i></li><li>• <i>Configuring Aggregated Ethernet LACP (CLI Procedure)</i></li><li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li></ul> |

## pfc

---

|                                 |                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pfc;</code>                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options compression</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options compression</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For interfaces with PPP encapsulation, configure the router to compress the protocol field to one byte.                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Protocol Field Compression on page 131</a></li></ul>                                                                                                                                                                                                                            |

## pic-type

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pic-type (atm1   atm2);</code>                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> ]                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | For ATM interfaces, configure the type of ATM PIC installed in your router.                                                        |
| <b>Options</b>                  | <p><b>atm1</b>—ATM1 PIC.</p> <p><b>atm2</b>—ATM2 IQ PIC.</p>                                                                       |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the ATM PIC Type</i></li> </ul>                                            |

## plp-to-clp

|                                 |                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>plp-to-clp;</code>                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces at-<i>fpc/pic/port</i> <a href="#">atm-options</a>],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> <a href="#">unit</a> <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>--fpc/pic/port</i> <a href="#">unit</a> <i>logical-unit-number</i>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | For ATM2 IQ interfaces only, enable the PLP setting to be copied to the cell-loss priority (CLP) bit.                                                                                                                                                                                                                      |
| <b>Default</b>                  | If you omit this statement, the Junos OS does not copy the PLP setting to the CLP bit.                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Enabling the PLP Setting to Be Copied to the CLP Bit</i></li> <li>• <i>Copying the PLP Setting to the CLP Bit on ATM Interfaces</i></li> </ul>                                                                                                                                 |

## plp1

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>plp1 cells;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i></code><br><code>    multipoint-destination <i>address</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code>    address <i>address</i> family <i>family</i> multipoint-destination <i>address</i>]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for QFX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the EPD threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded. This threshold applies to packets that have a PLP of 1.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>                  | EPD threshold is unregulated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b>cells</b> —Maximum number of cells.<br><b>Range:</b> For 1-port and 2-port OC12 interfaces, 1 through 425,984 cellsFor 1-port OC48 interfaces, 1 through 425,984 cellsFor 2-port OC3, DS3, and E3 interfaces, 1 through 212,992 cellsFor 4-port DS3 and E3 interfaces, 1 through 106,496 cells                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Two EPD Thresholds per Queue</i></li><li>• <i>Configuring an ATM Scheduler Map</i></li><li>• <a href="#">linear-red-profile on page 636</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## point-to-point

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | point-to-point;                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                              |
| <b>Description</b>              | For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, configure the interface unit as a point-to-point connection. This is the default connection type.                          |
| <b>Default</b>                  | If you omit this statement, the interface unit is configured as a point-to-point connection.                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Point-to-Point Connection on page 173</a></li> <li>• <a href="#">multipoint on page 693</a></li> </ul>                                      |

## policer (CFM Firewall)

|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> policer <i>cfm-policer</i> {     if-exceeding {         bandwidth-limit 8k;         burst-size-limit 2k;     }     then discard; } </pre>                                                                                                 |
| <b>Hierarchy Level</b>          | [edit firewall]                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                  |
| <b>Description</b>              | Attach an explicit policer to CFM sessions.                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Rate Limiting of Ethernet OAM Messages</a></li> <li>• <a href="#">policer (CFM Global) on page 766</a></li> <li>• <a href="#">policer (CFM Session) on page 767</a></li> </ul> |

## **policer (CFM Global)**

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>policer {<br/>    all <i>cfm-policer-name</i>;<br/>    continuity-check <i>cfm-policer-name</i>;<br/>    other <i>cfm-policer-name</i>;<br/>}</pre>                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management]                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Specify a policer at the global level to police the CFM traffic belonging to all sessions.                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>continuity-check <i>cfm-policer-name</i></b>—Police all continuity check packets with the policer specified.</p> <p><b>other <i>cfm-policer-name</i></b>—Police all non-continuity check packets with the policer specified.</p> <p><b>all <i>cfm-policer-name</i></b>—Police all CFM packets with policer specified. If the <b>all</b> option is used, then you cannot specify above two options.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Rate Limiting of Ethernet OAM Messages</i></li><li>• <a href="#">policer (CFM Session) on page 767</a></li></ul>                                                                                                                                                                                                                                      |



## policer (CFM Session)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> policer {     all <i>cfm-policer-name</i>;     continuity-check <i>cfm-policer-name</i>;     other <i>cfm-policer-name</i>; } </pre>                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>name</i> level <i>number</i> maintenance-association <i>name</i> ]                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Specify a separate policer to rate-limit packets specific to that session.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <ul style="list-style-type: none"> <li>• <b>continuity-check <i>cfm-policer-name</i></b>—Police continuity check packets belonging to this session.</li> <li>• <b>other <i>cfm-policer-name</i></b>—Police all non-continuity check packets belonging to this session.</li> <li>• <b>all <i>cfm-policer-name</i></b>—Police all CFM packets belonging to this session. If the <b>all</b> option is used, then you cannot specify the above two options.</li> </ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Rate Limiting of Ethernet OAM Messages</i></li> <li>• <a href="#">policer (CFM Global) on page 766</a></li> </ul>                                                                                                                                                                                                                                                                                          |

## policer (CoS)

---


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>policer <i>cos-policer-name</i> {<br/>    aggregate {<br/>        bandwidth-limit <i>bps</i>;<br/>        burst-size-limit <i>bytes</i>;<br/>    }<br/>    premium {<br/>        bandwidth-limit <i>bps</i>;<br/>        burst-size-limit <i>bytes</i>;<br/>    }<br/>}</pre>                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For Gigabit Ethernet IQ, Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, define a CoS policer template to specify the premium bandwidth and burst-size limits, and the aggregate bandwidth and burst-size limits. The premium policer is not supported on MX Series routers or for Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router). |
| <b>Options</b>                  | <p><b><i>cos-policer-name</i></b>—Name of one policer to specify the premium bandwidth and burst-size limits, and the aggregate bandwidth and burst-size limits.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Policers</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## policer (Interface)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> policer {     arp <i>policer-template-name</i>;     input <i>policer-template-name</i>;     output <i>policer-template-name</i>; } </pre>                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Apply a policer to an interface.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>arp <i>policer-template-name</i></b>—For <b>inet</b> family only, name of one policer to evaluate when ARP packets are received on the interface.</p> <p><b>input <i>policer-template-name</i></b>—Name of one policer to evaluate when packets are received on the interface.</p> <p><b>output <i>policer-template-name</i></b>—Name of one policer to evaluate when packets are transmitted on the interface.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying Policers on page 203</a></li> <li>• <i>Configuring Firewall Filters and Policers for VPLS</i></li> <li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                            |

## policer (MAC)

---

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <pre>policer {<br/>    input <i>cos-policer-name</i>;<br/>    output <i>cos-policer-name</i>;<br/>}</pre>                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>accept-source-mac</b> <i>mac-address</i> <i>mac-address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>accept-source-mac</b> <i>mac-address</i> <i>mac-address</i> ] |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                 |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, configure MAC policing.                                                                                                        |
| <div> <b>NOTE:</b><br/>On MX Series routers with Gigabit Ethernet or Fast Ethernet PICs, the following considerations apply:</div> <ul style="list-style-type: none"><li>• Interface counters do not count the 7-byte preamble and 1-byte frame delimiter in Ethernet frames.</li><li>• In MAC statistics, the frame size includes MAC header and CRC before any VLAN rewrite/imposition rules are applied.</li><li>• In traffic statistics, the frame size encompasses the L2 header without CRC after any VLAN rewrite/imposition rule.</li></ul> |                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>input <i>cos-policer-name</i></b> —Name of one policer to specify the premium bandwidth and aggregate bandwidth.<br><br><b>output <i>cos-policer-name</i></b> —Name of one policer to specify the premium bandwidth and aggregate bandwidth.                                                                                              |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                      |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering</i></li></ul>                                                                                                                                                                                                                                                   |

## policy-statement

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> policy-statement <i>policy-name</i> {   term <i>term-name</i> {     from {       family <i>family-name</i>;       match-conditions;       policy <i>subroutine-policy-name</i>;       prefix-list <i>prefix-list-name</i>;       prefix-list-filter <i>prefix-list-name</i> <i>match-type</i> &lt;<i>actions</i>&gt;;       protocol <i>protocol-name</i>;       route-filter <i>destination-prefix</i> <i>match-type</i> &lt;<i>actions</i>&gt;;       source-address-filter <i>source-prefix</i> <i>match-type</i> &lt;<i>actions</i>&gt;;     }     to {       match-conditions;       policy <i>subroutine-policy-name</i>;     }     then <i>actions</i>;   }   then {     no-entropy-label-capability;   } } </pre>                                                                                                             |
| <b>Hierarchy Level</b>     | [edit dynamic policy-options],<br>[edit logical-systems <i>logical-system-name</i> policy-options],<br>[edit policy-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for configuration in the dynamic database introduced in Junos OS Release 9.5.</p> <p>Support for configuration in the dynamic database introduced in Junos OS Release 9.5 for EX Series switches.</p> <p><b>inet-mdt</b> option introduced in Junos OS Release 10.0R2.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p><b>route-target</b> option introduced in Junos OS Release 12.2.</p> <p>Statement introduced in Junos OS 14.1X53-D20 for the OCX Series.</p> <p><b>protocol</b> and <b>traffic-engineering</b> options introduced in Junos OS Release 14.2.</p> <p><b>no-entropy-label-capability</b> option introduced in Junos OS Release 15.1.</p> |
| <b>Description</b>         | <p>Define a routing policy, including subroutine policies.</p> <p>A <i>term</i> is a named structure in which match conditions and actions are defined. Routing policies are made up of one or more terms. Each routing policy term is identified by a term name. The name can contain letters, numbers, and hyphens (-) and can be up to 255 characters long. To include spaces in the name, enclose the entire name in double quotation marks.</p> <p>Each term contains a set of match conditions and a set of actions:</p>                                                                                                                                                                                                                                                                                                              |

- Match conditions are criteria that a route must match before the actions can be applied. If a route matches all criteria, one or more actions are applied to the route.
- Actions specify whether to accept or reject the route, control how a series of policies are evaluated, and manipulate the characteristics associated with a route.

Generally, a router compares a route against the match conditions of each term in a routing policy, starting with the first and moving through the terms in the order in which they are defined, until a match is made and an explicitly configured or default action of **accept** or **reject** is taken. If none of the terms in the policy match the route, the router compares the route against the next policy, and so on, until either an action is taken or the default policy is evaluated.

If none of the match conditions of each term evaluates to true, the final action is executed. The final action is defined in an unnamed term. Additionally, you can define a default action (either **accept** or **reject**) that overrides any action intrinsic to the protocol.

The order of match conditions in a term is not relevant, because a route must match all match conditions in a term for an action to be taken.

To list the routing policies under the **[edit policy-options]** hierarchy level by **policy-statement *policy-name*** in alphabetical order, enter the **show policy-options** configuration command.

**Options** *actions*—(Optional) One or more actions to take if the conditions match. The actions are described in *Configuring Flow Control Actions*.

**family** *family-name*—(Optional) Specify an address family protocol. Specify **inet** for IPv4. Specify **inet6** for 128-bit IPv6, and to enable interpretation of IPv6 router filter addresses. For IS-IS traffic, specify **iso**. For IPv4 multicast VPN traffic, specify **inet-mvpn**. For IPv6 multicast VPN traffic, specify **inet6-mvpn**. For multicast-distribution-tree (MDT) IPv4 traffic, specify **inet-mdt**. For BGP route target VPN traffic, specify **route-target**. For traffic engineering, specify **traffic-engineering**.



**NOTE:** When *family* is not specified, the routing device or routing instance uses the address family or families carried by BGP. If multiprotocol BGP (MP-BGP) is enabled, the policy defaults to the protocol family or families carried in the network layer reachability information (NLRI) as configured in the *family* statement for BGP. If MP-BGP is not enabled, the policy uses the default BGP address family unicast IPv4.

**from**—(Optional) Match a route based on its source address.

**match-conditions**—(Optional in **from** statement; required in **to** statement) One or more conditions to use to make a match. The qualifiers are described in *Routing Policy Match Conditions*.

**policy subroutine-policy-name**—Use another policy as a match condition within this policy. The name identifying the subroutine policy can contain letters, numbers, and hyphens (-) and can be up to 255 characters long. To include spaces in the name, enclose it in quotation marks (" "). Policy names cannot take the form **\_\_.\*-internal\_\_**, as this form is reserved. For information about how to configure subroutines, see *Understanding Policy Subroutines in Routing Policy Match Conditions*.

**no-entropy-label-capability**—(Optional) Disable the entropy label capability advertisement at egress or transit routes specified in the policy.

**policy subroutine-policy-name**—Use another policy as a match condition within this policy. The name identifying the subroutine policy can contain letters, numbers, and hyphens (-) and can be up to 255 characters long. To include spaces in the name, enclose it in quotation marks (" "). Policy names cannot take the form **\_\_.\*-internal\_\_**, as this form is reserved. For information about how to configure subroutines, see *Understanding Policy Subroutines in Routing Policy Match Conditions*.

**policy-name**—Name that identifies the policy. The name can contain letters, numbers, and hyphens (-) and can be up to 255 characters long. To include spaces in the name, enclose it in quotation marks (" ").

**prefix-list prefix-list-name**—Name of a list of IPv4 or IPv6 prefixes.

**prefix-list-filter prefix-list-name**—Name of a prefix list to evaluate using qualifiers; *match-type* is the type of match (see *Configuring Prefix List Filters*), and *actions* is the action to take if the prefixes match.

**protocol** *protocol-name*—Name of the protocol used to control traffic engineering database import at the originating point.

**route-filter** *destination-prefix match-type <actions>*—(Optional) List of routes on which to perform an immediate match; *destination-prefix* is the IPv4 or IPv6 route prefix to match, *match-type* is the type of match (see *Configuring Route Lists*), and *actions* is the action to take if the *destination-prefix* matches.

**source-address-filter** *source-prefix match-type <actions>*—(Optional) Unicast source addresses in multiprotocol BGP (MBGP) and Multicast Source Discovery Protocol (MSDP) environments on which to perform an immediate match. *source-prefix* is the IPv4 or IPv6 route prefix to match, *match-type* is the type of match (see *Configuring Route Lists*), and *actions* is the action to take if the *source-prefix* matches.

**term** *term-name*—Name that identifies the term. The term name must be unique in the policy. It can contain letters, numbers, and hyphens (-) and can be up to 64 characters long. To include spaces in the name, enclose the entire name in quotation marks (" "). A policy statement can include multiple terms. We recommend that you name all terms. However, you do have the option to include an unnamed term which must be the final term in the policy. To configure an unnamed term, omit the **term** statement when defining match conditions and actions.

**to**—(Optional) Match a route based on its destination address or the protocols into which the route is being advertised.


**then**—(Optional) Actions to take on matching routes. The actions are described in *Configuring Flow Control Actions* and *Configuring Actions That Manipulate Route Characteristics*.

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Required Privilege</b> | routing—To view this statement in the configuration.        |
| <b>Level</b>              | routing-control—To add this statement to the configuration. |

|                              |                                                                     |
|------------------------------|---------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>dynamic-db</i></li></ul> |
|------------------------------|---------------------------------------------------------------------|



## pop

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | pop;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit logical-unit-number</b><br>input-vlan-map],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br>output-vlan-map]                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <div>  <p><b>NOTE:</b> On EX4300 switches, <b>pop</b> is not supported at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> input-vlan-map] hierarchy level.</p> </div> <p>For Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2, and IQ2-E interfaces; 10-Gigabit Ethernet LAN/WAN PIC; aggregated Ethernet interfaces using Gigabit Ethernet IQ interfaces; 100-Gigabit Ethernet Type 5 PIC with CFP; and Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces, specify the VLAN rewrite operation to remove a VLAN tag from the top of the VLAN tag stack. The outer VLAN tag of the frame is removed.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Removing a VLAN Tag</i></li> <li>• <i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## pop-all-labels

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>pop-all-labels {<br/>    required-depth number;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options mpls],<br>[edit interfaces <i>interface-name</i> sonet-options mpls],<br>[edit interfaces <i>interface-name</i> fastether-options mpls],<br>[edit interfaces <i>interface-name</i> gigether-options mpls]                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For passive monitoring on ATM, SONET/SDH, Fast Ethernet, and Gigabit Ethernet interfaces only, removes up to two MPLS labels from incoming IP packets. For passive monitoring on T Series devices, removes up to five MPLS labels from incoming IP packets.</p> <p>This statement has no effect on IP packets with more than two MPLS labels, or IP packets with more than five MPLS labels on T Series devices. Packets with MPLS labels cannot be processed by the Monitoring Services PIC; if packets with MPLS labels are forwarded to the Monitoring Services PIC, they are discarded.</p> <p>The remaining statement is explained separately.</p> |
| <b>Default</b>                  | If you omit this statement, the MPLS labels are not removed, and the packet is not processed by the Monitoring Services PIC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing MPLS Labels from Incoming Packets</i></li><li>• <i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                     |

## pop-pop

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | pop-pop;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP, and for 10-Gigabit Ethernet SFP interfaces on EX Series switches, specify the VLAN rewrite operation to remove both the outer and inner VLAN tags of the frame.                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Removing the Outer and Inner VLAN Tags</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## pop-swap

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | pop-swap;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>Specify the VLAN rewrite operation to remove the outer VLAN tag of the frame, and replace the inner VLAN tag of the frame with a user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.</p> <p>You can use this statement on Gigabit Ethernet IQ, IQ2, IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, on aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP.</p>             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing the Outer VLAN Tag and Rewriting the Inner VLAN Tag</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                               |

## port

|                                 |                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | port {<br>minimum <i>port-number</i> ;<br>maximum <i>port-number</i> ;<br>}                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces vsp- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> <b>compression</b> rtp]                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                 |
| <b>Description</b>              | For voice services interfaces only, assign User Datagram Protocol (UDP) destination port numbers reserved for Real-Time Transport Protocol (RTP) traffic.                                                         |
| <b>Options</b>                  | <p><b>minimum <i>port-number</i></b>—Specify minimum port number.<br/><b>Range:</b> 0 through 65,535</p> <p><b>maximum <i>port-number</i></b>—Specify maximum port number.<br/><b>Range:</b> 0 through 65,535</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                               |

## port-priority

|                                 |                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | port-priority <i>priority</i> ;                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>gigether-options</b> <b>802.3ad</b> lacp]                                                                                                                                                          |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 11.4 for EX Series switches.</p>                                                                                                            |
| <b>Description</b>              | Define LACP port priority at the interface level.                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b><i>priority</i></b>—Priority for being elected to be the active port and both collect and distribute traffic. A smaller value indicates a higher priority for being elected.<br/><b>Range:</b> 0 through 65535<br/><b>Default:</b></p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Configuring Aggregated Ethernet LACP</i></li> </ul>                                         |

## port-status-tlv

---

|                                 |                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | port-status-tlv blocked;                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet</a> connectivity-fault-management <a href="#">action-profile</a> <i>tlv-action</i> event]                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                                                                                                                                                                |
| <b>Description</b>              | Define an <b>action-profile</b> consisting of various events and the action. Based on values of <b>port-status-tlv</b> in the received CCM packets, specific action such as <i>interface-down</i> can be taken using <a href="#">action-profile</a> options. |
| <b>Options</b>                  | <b>blocked</b> —When the incoming CCM packet contains port status TLV with value blocked, the action will be triggered for this action-profile.                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a CFM Action Profile to Specify CFM Actions for CFM Events</i></li><li>• <i>Configuring Remote MEP Action Profile Support</i></li></ul>                                                               |

## post-service-filter

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | post-service-filter <i>filter-name</i> ;                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">service</a> <a href="#">input</a> ],<br>[edit logical-systems <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">service</a> <a href="#">input</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Define the filter to be applied to traffic after service processing. The filter is applied only if a service set is configured and selected.                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <b><i>filter-name</i></b> —Identifier for postservice filter.                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                    |

## ppp-options

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax          | <pre> ppp-options {   authentication [ <i>authentication-protocols</i> ];   mtu (<i>size</i>   use-lower-layer);   mru <i>size</i>;   chap {     access-profile <i>name</i>;     challenge-length minimum <i>minimum-length</i> maximum <i>maximum-length</i>;     default-chap-secret <i>name</i>;     local-name <i>name</i>;     passive;   }   compression {     acfc;     pfc;   }   dynamic-profile <i>profile-name</i>;   initiate-ncp (ip   ipv6   dual-stack-passive)   lcp-max-conf-req <i>number</i>   lcp-restart-timer <i>milliseconds</i>;   loopback-clear-timer <i>seconds</i>;   ncp-max-conf-req <i>number</i>   ncp-restart-timer <i>milliseconds</i>;   on-demand-ip-address   pap {     access-profile <i>name</i>;     default-pap-password <i>password</i>;     local-name <i>name</i>;     local-password <i>password</i>;     passive;   } } </pre> |
| Hierarchy Level | <pre> [edit interfaces <i>interface-name</i>], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>] </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** On interfaces with PPP encapsulation, configure PPP-specific interface properties.

For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:

- **atm-ppp-llc**—PPP over AAL5 LLC encapsulation.
- **atm-ppp-vc-mux**—PPP over AAL5 multiplex encapsulation.



**BEST PRACTICE:** On inline service (si) interfaces for L2TP, only the **chap** and **pap** statements are typically used for subscriber management. We

recommend that you leave the other statements subordinate to **ppp-options**—including those subordinate to **chap** and **pap**—at their default values.

.....  
The remaining statements are explained separately.

|                                 |                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 123</a></li><li>• <a href="#">Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface</a></li></ul> |

---

## pppoe-options

|                                 |                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>pppoe-options {<br/>    access-concentrator name;<br/>    auto-reconnect seconds;<br/>    (client   server);<br/>    service-name name;<br/>    underlying-interface interface-name;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces pp0 unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> ]                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>client</b> Statement introduced in Junos OS Release 8.5.<br><b>server</b> Statement introduced in Junos OS Release 8.5.                       |
| <b>Description</b>              | Configure PPP over Ethernet-specific interface properties.<br><br>The remaining statements are explained separately.                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a PPPoE Interface</a></li></ul>                                                                                                       |




## pppoe-underlying-options (Static and Dynamic Subscribers)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>pppoe-underlying-options {   access-concentrator <i>name</i>;   dynamic-profile <i>profile-name</i>;   direct-connect   duplicate-protection;   max-sessions <i>number</i>;   max-sessions-vsa-ignore;   service-name-table <i>table-name</i>;   short-cycle-protection &lt;lockout-time-min <i>minimum-seconds</i>&gt; &lt;lockout-time-max     <i>maximum-seconds</i>&gt; &lt;filter [<i>aci</i>]&gt;; }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Configure PPPoE-specific interface properties for the underlying interface on which the router creates a static or dynamic PPPoE logical interface. The underlying interface must be configured with PPPoE (<b>ppp-over-ether</b>) encapsulation.</p> <p>The remaining statements are explained separately.</p>                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PPPoE</i> (for static interfaces)</li> <li>• <i>Configuring an Underlying Interface for Dynamic PPPoE Subscriber Interfaces</i></li> <li>• <i>Assigning a Service Name Table to a PPPoE Underlying Interface</i></li> </ul>                                                                                                                                   |

## preferred

---

|                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                     | preferred;                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>                                                                                                                                                            | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br>family <i>family</i> address <i>address</i> ] |
| <b>Release Information</b>                                                                                                                                                        | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                              |
| <b>Description</b>                                                                                                                                                                | Configure this address to be the preferred address on the interface. If you configure more than one address on the same subnet, the preferred source address is chosen by default as the source address when you initiate frame transfers to destinations on the subnet.                    |
| <div> <b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems.</div> |                                                                                                                                                                                                                                                                                             |
| <b>Default</b>                                                                                                                                                                    | The lowest-numbered address on the subnet is the preferred address.                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                                                                                                                                                   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                     |
| <b>Related Documentation</b>                                                                                                                                                      | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Address on page 187</a></li></ul>                                                                                                                                                                             |

## preferred-source-address

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>preferred-source-address address;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>unnumbered-address</b> <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>unnumbered-address</b> <i>interface-name</i> ]                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>For unnumbered Ethernet interfaces configured with a loopback interface as the donor interface, specify one of the loopback interface's secondary addresses as the preferred source address for the unnumbered Ethernet interface. Configuring the preferred source address enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet interfaces in your network.</p> <p>Configuration of a preferred source address for unnumbered Ethernet interfaces is supported for the IPv4 and IPv6 address families.</p> |
| <b>Options</b>                  | <b>address</b> —Secondary IP address of the donor loopback interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces on page 195</a></li> <li>• <a href="#">address on page 397</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                         |

## premium (Hierarchical Policer)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>premium {<br/>    if-exceeding {<br/>        bandwidth-limit <i>bandwidth</i>;<br/>        burst-size-limit <i>burst</i>;<br/>    }<br/>    then {<br/>        discard;<br/>    }<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit <a href="#">dynamic-profiles profile-name</a> firewall hierarchical-policer],<br>[edit firewall hierarchical-policer]                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support at the [edit <a href="#">dynamic-profiles ... hierarchical-policer name</a> ] hierarchy level introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | On M40e, M120, and M320 edge routers with FPC input as FFPC and FPC output as SFPC, and on MX Series, T320, T640, and T1600 edge routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, specify a premium level for a hierarchical policer.                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | Options are described separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Applying Policers on page 203</a></li><li>• <i>Guidelines for Applying Traffic Policers</i></li><li>• <i>Hierarchical Policer Configuration Overview</i></li><li>• <i>Hierarchical Policers</i></li><li>• <i>aggregate (Hierarchical Policer)</i></li><li>• <a href="#">bandwidth-limit (Hierarchical Policer) on page 427</a></li><li>• <a href="#">burst-size-limit (Hierarchical Policer) on page 439</a></li><li>• <i>hierarchical-policer</i></li><li>• <i>if-exceeding (Hierarchical Policer)</i></li></ul> |

## premium (Output Priority Map)

|                                 |                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>premium {   forwarding-class <i>class-name</i> {     loss-priority (high   low);   } }</pre>                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">output-priority-map</a> <a href="#">classifier</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                         |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ interfaces only, define the classifier for egress premium traffic.</p> <p>The statements are explained separately.</p>                                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying an Output Priority Map</a></li> <li>• <a href="#">input-priority-map on page 599</a></li> </ul>                                           |

## premium (Policer)


|                                 |                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>premium {   bandwidth-limit <i>bps</i>;   burst-size-limit <i>bytes</i>; }</pre>                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">policer</a> <a href="#">cos-policer-name</a> ]                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                           |
| <b>Description</b>              | <p>Define a policer to apply to nonpremium traffic.</p> <p>The statements are explained separately.</p>                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Gigabit Ethernet Policers</a></li> <li>• <a href="#">aggregate (Gigabit Ethernet CoS Policer) on page 403</a></li> <li>• <a href="#">ieee802.1p on page 583</a></li> </ul> |

## preserve-interface

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | preserve-interface;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Provide link PIC replication, providing MLPPP link redundancy at the port level. This feature is supported with SONET APS and the following link PICs:</p> <ul style="list-style-type: none"><li>• Channelized OC3 IQ PIC</li><li>• Channelized OC12 IQ PIC</li><li>• Channelized STM1 IQ PIC</li></ul> <p>Link PIC replication provides the ability to add two sets of links, one from the active SONET PIC and the other from the standby SONET PIC, to the same bundle. If the active SONET PIC fails, links from the standby PIC are used without triggering link renegotiation. All the negotiated state is replicated from the active links to the standby links to prevent link renegotiation.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Link PIC Redundancy</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## primary (Address on Interface)

|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                       | <code>primary;</code>                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>                                                                                                                                                              | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ]                    |
| <b>Release Information</b>                                                                                                                                                          | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                      |
| <b>Description</b>                                                                                                                                                                  | Configure this address to be the primary address of the protocol on the interface. If the logical unit has more than one address, the primary address is used by default as the source address when packet transfer originates from the interface and the destination address does not indicate the subnet. |
| <div>  <b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems. </div> |                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>                                                                                                                                                                      | For unicast traffic, the primary address is the lowest non-127 (in other words, non-loopback) preferred address on the unit.                                                                                                                                                                                |
| <b>Required Privilege Level</b>                                                                                                                                                     | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                     |
| <b>Related Documentation</b>                                                                                                                                                        | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Address on page 187</a></li> </ul>                                                                                                                                                                                           |

## primary (AS PIC or Multiservices PIC Interfaces)

|                                 |                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>primary <i>interface-name</i>;</code>                                                                                                       |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> (rsp0   rsp1) <a href="#">redundancy-options</a> ]                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                 |
| <b>Description</b>              | Specify the primary AS PIC or MultiServices PIC interface.                                                                                        |
| <b>Options</b>                  | <i>interface-name</i> —The identifier for the AS PIC interface or MultiServices PIC interface, which must be of the form <b>sp-fpc/pic/port</b> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li> </ul>                      |

## priority (OAM Connectivity-Fault Management)

---

|                                 |                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>priority number;</code>                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name mep mep-id</a> ]<br><br>For EX Series Switches:<br><br>[edit protocols oam ethernet connectivity-fault-management maintenance-domain domain-name maintenance-association ma-name mep mep-id] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | IEEE 802.1p priority bits used by the continuity check messages.                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <b>number</b> —Configure the IEEE 802.1p priority bits to be used in the VLAN header of the CFM packets.<br><b>Range:</b> 0 through 7                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li></ul>                                                                                                                                                                                                    |


## priority (Schedulers)

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>priority (high   low);</code>                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name forwarding-class class-name</i> ]       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign queuing priority to a forwarding class.                                             |
| <b>Options</b>                  | <b>low</b> —Forwarding class has low priority.<br><b>high</b> —Forwarding class has high priority.                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li></ul>                      |



## promiscuous-mode

|                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                             | <code>promiscuous-mode {<br/>    vpi vpi-identifier;<br/>}</code>                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>                                                                                                                                                                                    | [edit interfaces <i>interface-name</i> atm-options]                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                                                                                                                                                                                | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                |
| <b>Description</b>                                                                                                                                                                                        | For ATM interfaces with <b>atm-ccc-cell-relay</b> encapsulation, map all incoming cells from either an interface port or a VP to a single label-switched path (LSP) without restricting the VCI number. Promiscuous mode allows you to map traffic from all 65,535 VCIs to a single LSP, or from all 256 VPIs to a single LSP. |
| <div>  <p><b>NOTE:</b> In ACX Series routers, the statement supports only Inverse Multiplexing for ATM (IMA).</p> </div> |                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                                                                                                                                                                                            | <b>vpi-identifier</b> —Open this VPI in promiscuous mode.<br><b>Range:</b> 0 through 255                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b>                                                                                                                                                                           | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                        |
| <b>Related Documentation</b>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Configuring ATM Cell-Relay Promiscuous Mode</li> <li><a href="#">vpi (ATM CCC Cell-Relay Promiscuous Mode) on page 945</a></li> </ul>                                                                                                                                                   |

## protect-circuit

---

|                                 |                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>protect-circuit <i>group-name</i>;</code>                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                               |
| <b>Description</b>              | Configure the protect router in an APS circuit pair. When the working interface fails, APS brings up the protection circuit and the traffic is moved to the protection circuit. |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name.                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li><li>• <a href="#">working-circuit on page 954</a></li></ul>                    |

## protection-group

```
Syntax protection-group {
 ethernet-ring ring-name {
 data-channel {
 vlan number
 }
 east-interface {
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 }
 guard-interval number;
 node-id mac-address;
 restore-interval number;
 ring-protection-link-owner;
 non-revertive;
 wait-to-block-interval number;
 major-ring-name name;
 propagate-tc;
 compatibility-version (1|2);
 ring-id number;
 non-vc-mode;
 dot1p-priority number;
 west-interface {
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 virtual-control-channel {
 west-interface name;
 east-interface name;
 }
 }
 }
 control-vlan (vlan-id | vlan-name);
 east-interface {
 node-id mac-address;
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 interface-none
 ring-protection-link-end;
 }
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 data-channel {
 vlan number
 }
}
```

```

}
guard-interval number;
node-id mac-address;
restore-interval number;
ring-protection-link-owner;
west-interface {
 node-id mac-address;
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 interface-none
 ring-protection-link-end;
}
control-channel channel-name {
 vlan number;
 interface name interface-name
}
}
}
guard-interval number;
restore-interval number;
traceoptions {
 file filename <no-stamp> <world-readable | no-world-readable> <replace> <size size>;
 flag flag;
}
}

```

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit protocols]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Configure Ethernet ring protection switching.</p> <p>The statements are explained separately. All statements apply to MX Series routers. EX Series switches do not assign <b>node-id</b> and use <b>control-vlan</b> instead of <b>control-channel</b>.</p>                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li> <li>• <i>Example: Configuring Load Balancing Within Ethernet Ring Protection for MX Series Routers</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul> |

## protocol-down

|                                 |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>protocol-down;</code>                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">action-profile</a> <a href="#">event</a> ]                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                |
| <b>Description</b>              | Upper layer indication of protocol down event. When the <b>protocol-down</b> statement is included, the protocol down event triggers the action specified under the <b>action</b> statement. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an OAM Action Profile</a></li> </ul>                                                                                        |

## protocols

|                            |                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>protocols [inet iso mpls];</code>                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <a href="#">unit</a> logical-unit-number <a href="#">family</a> <a href="#">tcc</a> ]                                                                                                                                                                                                                    |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>         | For Layer 2.5 VPNs on T Series, MX Series, M120, and M320 routers support, configure IS-IS (ISO traffic) or MPLS traffic to traverse a TCC interface. By default, IPv4 (inet) traffic runs on T Series, MX, Series, M120, and M320 routers and over TCC interfaces. You must configure the same traffic type on both ends of the Layer 2.5 VPN. |



**NOTE:** Some platform and FPC combinations can not pass TCC encapsulated ISO traffic. See *Platforms/FPCs That Cannot Forward TCC Encapsulated ISO Traffic* for details.


|                                 |                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 253</a></li> <li>• <a href="#">Platforms/FPCs That Cannot Forward TCC Encapsulated ISO Traffic</a></li> </ul> |

## proxy


---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>proxy inet-address <i>address</i>;</code>                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc]                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For Layer 2.5 VPNs using an Ethernet interface as the TCC router, configure the IP address for which the TCC router is proxying. Ethernet TCC is supported on interfaces that carry IPv4 traffic only. Ethernet TCC encapsulation is supported on 1-port Gigabit Ethernet, 2-port Gigabit Ethernet, 4-port Gigabit Ethernet, and 4-port Fast Ethernet PICs only. Ethernet TCC is not supported on the T640 router. |
| <b>Options</b>                  | <b>inet-address</b> —Configure the IP address of the neighbor to the TCC router.                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Translation Cross-Connect Interface Switching</i></li><li>• <i>Example: Configuring an Ethernet TCC or Extended VLAN TCC</i></li><li>• <a href="#">remote on page 810</a></li><li>• <i>Junos OS VPNs Library for Routing Devices</i></li></ul>                                                                                                              |

## proxy-arp

|                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                      | <code>proxy-arp (restricted   unrestricted);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>                                                                                                                                                                                                             | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                                                                                                                                                                                                         | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.6 for EX Series switches.<br><b>restricted</b> added in Junos OS Release 10.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                                                                                                                                                                                                                 | For Ethernet interfaces only, configure the router or switch to respond to any ARP request, as long as the router or switch has an active route to the ARP request's target address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <div>  <p><b>NOTE:</b> You must configure the IP address and the <code>inet</code> family for the interface when you enable proxy ARP.</p> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>                                                                                                                                                                                                                     | Proxy ARP is not enabled. The router or switch responds to an ARP request only if the destination IP address is its own.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• <b>none</b>—The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.</li> <li>• <b>restricted</b>—(Optional) The router or switch responds to ARP requests in which the physical networks of the source and target are different and does not respond if the source and target IP addresses are in the same subnet. The router or switch must also have a route to the target IP address.</li> <li>• <b>unrestricted</b>—(Optional) The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.</li> </ul> |
|                                                                                                                                                                                                                                    | <b>Default:</b> <code>unrestricted</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b>                                                                                                                                                                                                    | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• <i>Configuring Restricted and Unrestricted Proxy ARP</i></li> <li>• <i>Configuring Proxy ARP (CLI Procedure)</i></li> <li>• <i>Example: Configuring Proxy ARP on an EX Series Switch</i></li> <li>• <i>Configuring Gratuitous ARP</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                |

## push

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>push;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | <p> <b>NOTE:</b> On EX4300 switches, <code>push</code> is not supported at the <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>]</code> hierarchy level.</p> <p>Specify the VLAN rewrite operation to add a new VLAN tag to the top of the VLAN stack. An outer VLAN tag is pushed in front of the existing VLAN tag.</p> <p>You can use this statement on Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces; 10-Gigabit Ethernet LAN/WAN PIC; aggregated Ethernet interfaces using Gigabit Ethernet IQ interfaces; 100-Gigabit Ethernet Type 5 PIC with CFP; and Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces.</p> <p>If you include the <b>push</b> statement in the configuration, you must also include the <a href="#">pop</a> statement at the <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>]</code> hierarchy level.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Stacking a VLAN Tag</a></li> <li>• <a href="#">Configuring Q-in-Q Tunneling (CLI Procedure)</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



## push-push

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | push-push;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Specify the VLAN rewrite operation to push two VLAN tags in front of the frame.<br><br>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, on aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP.                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Stacking Two VLAN Tags</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## queue-depth

---

|                                 |                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>queue-depth <i>cells</i>;</code>                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i> ]                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                      |
| <b>Description</b>              | For ATM2 IQ interfaces only, define maximum queue depth in the CoS VC drop profile. Packets are always dropped beyond the defined maximum. This statement is mandatory; there is no default configuration.                                                                             |
| <b>Default</b>                  | Buffer usage is unregulated.                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <b><i>cells</i></b> —Maximum number of cells the queue can contain.<br><b>Range:</b> 1 through 64,000 cells                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li><li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li><li>• <a href="#">high-plp-threshold on page 571</a></li><li>• <a href="#">low-plp-threshold on page 664</a></li></ul> |

## queue-length

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>queue-length <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | For ATM1 interfaces only, define the maximum queue length in the traffic-shaping profile. For ATM1 PICs, each VC has its own independent shaping parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>                  | Buffer usage is unregulated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <b><i>number</i></b> —Maximum number of packets the queue can contain.<br><b>Range:</b> 1 through 16,383 packets<br><b>Default:</b> 16,383 packets                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the ATM1 Queue Length</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## queues

|                                 |                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>queues [ <i>queue-numbers</i> ];</code>                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>vsp-fpc/pic/port</i> unit <i>logical-unit-number</i> <b>compression rtp</b> ]                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                      |
| <b>Description</b>              | For voice services interfaces only, assign queue numbers for RTP traffic.                                                                                                                              |
| <b>Options</b>                  | <b>queues <i>queue-numbers</i></b> —Assign one or more of the following queues: <b>q0</b> , <b>q1</b> , <b>q2</b> , <b>q3</b> . For VRRP services, specify the <b>q3</b> option instead of <b>q0</b> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                    |

## quiet-period

---

|                                 |                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>quiet-period seconds;</code>                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <code>[edit protocols dot1x authenticator interface <i>interface-id</i>]</code>                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting authentication.                                                                                                              |
| <b>Options</b>                  | <b>seconds</b> —Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting authentication.<br><b>Range:</b> 0 through 65,535 seconds<br><b>Default:</b> 60 seconds                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 420</a></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li></ul> |

## radius-realm

---

|                                 |                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>radius-realm <i>radius-realm-string</i>;</code>                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a>],</code><br><code>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                              |
| <b>Description</b>              | Specify that the user-defined RADIUS realm string is appended as a last piece to the username and used by RADIUS to direct the authentication request to a profile that does not allocates addresses.                                                                       |
| <b>Options</b>                  | <b><i>radius-realm-string</i></b> —A string to describe the RADIUS realm.                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>                                                                                                                                             |

## ranges (Dynamic Stacked VLAN)

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ranges (any   <i>low-tag-high-tag</i>),(any   <i>low-tag-high-tag</i>);</code>                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure stacked-vlan-ranges <a href="#">dynamic-profile profile-name</a> ]                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                 |
| <b>Description</b>              | Configure VLAN ranges for dynamic, auto-sensed stacked VLANs.                                                                                                                                                 |
| <b>Options</b>                  | <p><b>any</b>—The entire VLAN range.</p> <p><b><i>low-tag</i></b>—The lower limit of the VLAN range.</p> <p><b><i>high-tag</i></b>—The upper limit of the VLAN range.</p> <p><b>Range:</b> 1 through 4094</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs</a></li> </ul>                                                    |

## ranges (Dynamic VLAN)

|                                 |                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ranges (any   <i>low-tag</i>)-(any   <i>high-tag</i>);</code>                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure vlan-ranges <a href="#">dynamic-profile profile-name</a> ]                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                 |
| <b>Description</b>              | Configure VLAN ranges for dynamic, auto-sensed VLANs.                                                                                                                                                         |
| <b>Options</b>                  | <p><b>any</b>—The entire VLAN range.</p> <p><b><i>low-tag</i></b>—The lower limit of the VLAN range.</p> <p><b><i>high-tag</i></b>—The upper limit of the VLAN range.</p> <p><b>Range:</b> 1 through 4094</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs</a></li> </ul>                                                 |

## rate

---

|                                 |                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>rate percentage;</code>                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <code>receive-bucket</code> ],<br>[edit interfaces <i>interface-name</i> <code>transmit-bucket</code> ]                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                   |
| <b>Description</b>              | Specify percentage of the interface line rate that is available to receive or transmit packets.                                                                     |
| <b>Options</b>                  | <b>percentage</b> —Percentage of the interface line rate that is available to receive or transmit packets.<br><b>Range:</b> 0 through 100                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li></ul> |

## rate

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>rate new-sessions-per-second;</code>                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options session-limit]                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                           |
| <b>Description</b>              | Specify the maximum number of new sessions allowed per second.                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |

## rdi

---

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | rdi;                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam-ethernet</a> connectivity-fault-management <a href="#">action-profile</a> <i>tlv-action</i> event]                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.1.                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>Define a new event <b>rdi</b>. The remote defect indication (rdi) event is triggered whenever CCM packets are received from a remote location with the rdi bit set.</p> <p>This event is cleared and action is reverted when none of the remote MEPs send the CCM packets with the RDI bit.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a CFM Action Profile to Specify CFM Actions for CFM Events</i></li> </ul>                                                                                                                                                                  |

## reassemble-packets

---

|                                 |                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | reassemble-packets;                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i>]</p> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.                                                                                                                                                               |
| <b>Description</b>              | Enable reassembly of fragmented tunnel packets on generic routing encapsulation (GRE) tunnel interfaces.                                                                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Configuring Packet Reassembly</i></li> </ul>                                         |

## reauthentication

---

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | reauthentication (disable   interval <i>seconds</i> );                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Set or disable the periodic reauthentication of the client.                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <ul style="list-style-type: none"><li>• <b>disable</b>—Disable the periodic reauthentication of the client.</li><li>• <b>interval <i>seconds</i></b>—Specify the periodic reauthentication time interval.</li></ul> <p><b>Range:</b> 1 through 65,535 seconds<br/><b>Default:</b> 3600 seconds</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li><li>• <a href="#">quiet-period on page 802</a></li></ul>                       |



## receive-bucket

|                                 |                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>receive-bucket {     <b>overflow</b> (discard   tag);     <b>rate</b> <i>percentage</i>;     <b>threshold</b> <i>bytes</i>; }</pre>                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>Set parameters for the receive leaky bucket, which specifies what percentage of the interface's total capacity can be used to receive packets.</p> <p>For each DS3 channel on a channelized OC12 interface, you can configure a unique receive bucket.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li> <li>• <a href="#">transmit-bucket on page 897</a></li> </ul>                                                                                  |

## receive-options-packets

|                                 |                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | receive-options-packets;                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                    |
| <b>Description</b>              | For a Monitoring Services PIC and an ATM or SONET/SDH PIC installed in an M160, M40e, or T Series router, guarantee conformity with cflowd records structure. This statement is required when you enable passive monitoring.                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Passive Monitoring on ATM Interfaces</a></li> <li>• <a href="#">Enabling Packet Flow Monitoring on SONET/SDH Interfaces</a></li> </ul>                                                                 |

## receive-ttl-exceeded

---

|                                 |                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | receive-ttl-exceeded;                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                      |
| <b>Description</b>              | For Monitoring Services PIC and an ATM or SONET/SDH PIC installed in an M160, M40e, or T Series router, guarantee conformity with cflowd records structure. This statement is required when you enable passive monitoring.                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling Passive Monitoring on ATM Interfaces</i></li><li>• <i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i></li></ul>                                                                                                                        |

## red-differential-delay

---

|                                 |                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | red-differential-delay <i>milliseconds</i> ;                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                     |
| <b>Description</b>              | For link services and voice services interfaces only, configure the red differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.                                             |
| <b>Options</b>                  | <b>milliseconds</b> —Red differential delay threshold.<br><b>Range:</b> 1 through 2000 milliseconds<br><b>Default:</b> 10 milliseconds                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">action-red-differential-delay on page 396</a></li><li>• <a href="#">yellow-differential-delay on page 954</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul> |

## redundancy-options

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> redundancy-options {     primary <i>interface-name</i>;     secondary <i>interface-name</i>;     hot-standby; } </pre>                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | <pre> [edit <a href="#">interfaces</a> (rsp0   rsp1)], [edit interfaces <i>rlsqnumber</i>] [edit interfaces <i>rspnumber</i>] [edit interfaces <i>rmsnumber</i>] </pre>                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Specify the primary and secondary (backup) AS PIC interfaces or MultiServices PIC interfaces.                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><b>primary <i>interface-name</i></b>—The identifier for the primary LSQ AS, rsp, or rms interface.</p> <p><b>secondary <i>interface-name</i></b>—The identifier for the secondary (backup) LSQ AS, rsp, or rmsinterface.</p> <p><b>hot-standby</b>—For one-to-one AS, rsp, or rms redundancy configurations, specify that the failure detection and recovery must take place in less than 5 seconds.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                           |

## remote

---

|                                 |                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>remote {<br/>    (inet-address address   mac-address address);<br/>}</pre>                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc]                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For Layer 2.5 VPNs using an Ethernet interface as the TCC router, configure the location of the remote router. Ethernet TCC is supported on interfaces that carry IPv4 traffic only. Ethernet TCC encapsulation is supported on 1-port Gigabit Ethernet, 2-port Gigabit Ethernet, 4-port Gigabit Ethernet, and 4-port Fast Ethernet PICs only. |
| <b>Options</b>                  | <b>mac-address</b> —Configure the MAC address of the remote site.<br><br><b>inet-address</b> —Configure the IP address of the remote site.                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Translation Cross-Connect Interface Switching</i></li><li>• <i>Example: Configuring an Ethernet TCC or Extended VLAN TCC</i></li><li>• <a href="#">proxy on page 796</a></li><li>• <i>Junos OS VPNs Library for Routing Devices</i></li></ul>                                           |

## remote-loopback

---

|                                 |                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>remote-loopback;</pre>                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, set the remote DTE into loopback mode. Remove the statement from the configuration to take the remote DTE out of loopback mode. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Setting a Remote Interface into Loopback Mode</i></li></ul>                                                                                                                                                                                                        |

## remote-loopback-respond

|                            |                                                                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | remote-loopback-respond;                                                                                                                                      |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]                                                     |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.               |
| <b>Description</b>         | For T1 interfaces only, configure the router to respond to remote loopback requests. Remote loopback requests can be from the facilities data link or inband. |



**NOTE:** When configuring CT1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the remote-loopback-respond statement must be included at the [edit interfaces *ct1-fpc/pic/port*] hierarchy level.

|                                 |                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | The router does not respond to remote loop requests.                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the T1 Remote Loopback Response</i></li> <li>• <a href="#">feac-loop-respond on page 552</a></li> <li>• <a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 658</a></li> </ul> |

## remote-mep

---

|                                 |                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>remote-mep mep-id {<br/>    action-profile profile-name;<br/>    sla-iterator-profile profile-name {<br/>        data-tlv-size size;<br/>        iteration-count count-value;<br/>        priority priority-value;<br/>    }<br/>    detect-loc;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name mep mep-id</a> ]                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                     |
| <b>Description</b>              | Configure the numeric identifier of the remote maintenance association end point (MEP) within the maintenance association.                                                                                                                                        |
| <b>Options</b>                  | <p><b>mep-id</b>—Numeric identifier of the MEP.</p> <p><b>Range:</b> 1 through 8191</p> <p>The remaining statements are explained separately.</p>                                                                                                                 |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a MEP to Generate and Respond to CFM Protocol Messages</i></li><li>• <i>detect-loc</i></li></ul>                                                                                                           |

## remove-when-no-subscribers

---

|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>remove-when-no-subscribers;</pre>                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">auto-configure</a> ]                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.4.                                                                      |
| <b>Description</b>              | Remove subscriber VLANs automatically when no client sessions (for example, DHCP or PPPoE) exist on the VLAN.       |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Automatically Removing VLANs with No Subscribers</i></li></ul>           |

---

## request

---

|                                 |                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>request (protect   working);</code>                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                   |
| <b>Description</b>              | Perform a manual switch between the protect and working circuits. This statement is honored only if there are no higher-priority reasons to switch.                 |
| <b>Options</b>                  | <b>protect</b> —Request that the circuit become the protect circuit.<br><b>working</b> —Request that the circuit become the working circuit.                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Switching Between the Working and Protect Circuits</i></li><li>• <a href="#">force on page 558</a></li></ul> |

## required-depth

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <code>required-depth</code> <i>number</i> ;                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>atm-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>sonet-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>fastether-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> <b>mpls pop-all-labels</b> ]                                                                                                                 |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                          |
| Description              | <p>For passive monitoring on ATM and SONET/SDH interfaces only, specify the number of MPLS labels an incoming packet must have for the <b>pop-all-labels</b> statement to take effect.</p> <p>If you include the <b>required-depth 1</b> statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with one label only. If you include the <b>required-depth 2</b> statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with two labels only.</p> |
| Options                  | <p><b>number</b>—Number of MPLS labels on incoming IP packets.</p> <p><b>Range:</b> 1 or 2 labels</p> <p><b>Default:</b> If you omit this statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with one or two labels. The default is equivalent to including the <b>required-depth [ 1 2 ]</b> statement.</p>                                                                                                                                                           |
| Required Privilege Level | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Removing MPLS Labels from Incoming Packets</i></li><li>• <i>Enabling Packet Flow Monitoring on SONET/SDH Interfaces</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                               |



## restore-interval

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>restore-interval <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring <i>ring-name</i></a> ]                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.                                                                                                                                                                                                                          |
| <b>Description</b>              | Configures the number of minutes that the node does not process any Ethernet ring protection (ERP) protocol data units (PDUs).. This configuration is a global configuration and applies to all Ethernet rings if the Ethernet ring does not have a more specific configuration for this value. If no parameter is configured at the protection group level, the global configuration of this parameter uses the default value. |
| <b>Options</b>                  | <i>number</i> —Specify the restore interval.<br><b>Range:</b> 5 through 12 minutes                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul>           |

## retries

---

|                                 |                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>retries <i>integer</i>;</code>                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                |
| <b>Description</b>              | Set a limit on the number of failed authentication attempts between a port and a client. When the limit is exceeded, the port waits to reattempt authentication for the number of seconds set by the <b>quiet-period</b> statement configured at the same hierarchy level.   |
| <b>Options</b>                  | <b><i>integer</i></b> —Specify the number of retries.<br><b>Range:</b> 1 through 10<br><b>Default:</b> 3 retries                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li><li>• <a href="#">quiet-period on page 802</a></li></ul> |

## revert-time (Interfaces)

---

|                                 |                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>revert-time <i>seconds</i>;</code>                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                         |
| <b>Description</b>              | Configure APS revertive mode.                                                                                                                                                                                                                             |
| <b>Default</b>                  | APS operates in nonrevertive mode.                                                                                                                                                                                                                        |
| <b>Options</b>                  | <b><i>seconds</i></b> —Amount of time to wait after the working circuit has again become functional before making the working circuit active again.<br><b>Range:</b> 1 through 65,535 seconds<br><b>Default:</b> None (APS operates in nonrevertive mode) |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Revertive Mode</i></li></ul>                                                                                                                                                                       |

## revertive

|                            |                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | revertive;                                                                                                             |
| <b>Hierarchy Level</b>     | [edit interfaces aeX aggregated-ether-options lacp link-protection]                                                    |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 12.3 for EX Series switches. |
| <b>Description</b>         | Enable the ability to switch to a better priority link (if one is available).                                          |



**NOTE:** By default, LACP link protection is revertive. However, you can use this statement to define a specific aggregated Ethernet interface as revertive to override a global non-revertive statement specified at the [edit chassis] hierarchy level.

|                                 |                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>non-revertive (Chassis)</i></li> <li><i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li> </ul> |

## rfc-2615

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | rfc-2615;                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Include this statement to enable features described in RFC 2615, <i>PPP over SONET/SDH</i> .                            |
| <b>Default</b>                  | Settings required by RFC 1619, <i>PPP over SONET/SDH</i> .                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring PPP Support on SONET/SDH Interfaces</i></li> </ul>                |

## ring-protection-link-end

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ring-protection-link-end;                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ( <a href="#">east-interface</a>   <a href="#">west-interface</a> )]                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Specify that the port is one side of a ring protection link (RPL) by setting the RPL end flag.                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul> |

## ring-protection-link-owner

---

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ring-protection-link-owner;                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ]                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.                                                                                                                           |
| <b>Description</b>              | Specify the ring protection link (RPL) owner flag in the Ethernet protection ring. Include this statement only once for each ring (only one node can function as the RPL owner).                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS</i></li></ul> |

---

## routing-instance

---

|                                 |                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>routing-instance {<br/>    destination <i>routing-instance-name</i>;<br/>}</pre>                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                   |
| <b>Description</b>              | To configure <b>interfaces</b> and <b>logical-systems</b> , specify the destination routing instance that points to the routing table containing the tunnel destination address.                                    |
| <b>Default</b>                  | The default Internet routing table is <b>inet.0</b> .                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                   |

## routing-instance (PPPoE Service Name Tables)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>routing-instance <i>routing-instance-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <code>[edit protocols pppoe service-name-tables <i>table-name</i> <i>service</i> <i>service-name</i>],</code><br><code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <i>agent-specifier</i></code><br><code>aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>Use in conjunction with the <b>dynamic-profile</b> statement at the same hierarchy levels to specify the routing instance in which to instantiate a dynamic PPPoE interface. You can associate a routing instance with a named service entry, <b>empty</b> service entry, or <b>any</b> service entry configured in a PPPoE service name table, or with an agent circuit identifier/agent remote identifier (ACI/ARI) pair defined for these services.</p> <p>The routing instance associated with a service entry in a PPPoE service name table overrides the routing instance associated with the PPPoE underlying interface on which the dynamic PPPoE interface is created.</p> <p>If you include the <b>routing-instance</b> statement at the <code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> agent-specifier aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code> hierarchy level, you cannot also include the <b>static-interface</b> statement at this level. The <b>routing-instance</b> and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| <b>Options</b>                  | <b><i>routing-instance-name</i></b> —Name of the routing instance in which the router instantiates the dynamic PPPoE interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li><li>• <i>Assigning a Dynamic Profile and Routing Instance to a Service Name or ACI/ARI Pair for Dynamic PPPoE Interface Creation</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

---

## rpf-check (Dynamic Profiles)

---

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>rpf-check {<br/>    fail-filter <i>filter-name</i>;<br/>    mode loose;<br/>}</pre>                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                                                                                                                             |
| <b>Description</b>              | <p>Check whether traffic is arriving on an expected path. You can include this statement with the <b>inet</b> protocol family only.</p> <p>The remaining statements are explained separately.</p>                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Unicast RPF Strict Mode on page 220</a></li><li>• <i>Configuring Unicast RPF and Fail Filters in Dynamic Profiles for Subscriber Interfaces</i></li></ul> |

## rpf-check (interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>rpf-check {<br/>    fail-filter <i>filter-name</i>;<br/>    mode loose;<br/>}</pre>                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for interface <b>ps0</b> (pseudowire subscriber logical interface device) added in Junos OS Release 15.1.                                                                                                                                                                                                             |
| <b>Description</b>              | <p>Check whether traffic is arriving on an expected path. You can include this statement with the <b>inet</b> or <b>inet6</b> protocol family only.</p> <p>The <b>mode</b> statement is explained separately.</p>                                                                                                                                                                  |
| <b>Options</b>                  | <b>fail-filter</b> —A filter to evaluate when packets are received on the interface. If the RPF check fails, this optional filter is evaluated. If the fail filter is not configured, the default action is to silently discard the packet.                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Unicast RPF Strict Mode on page 220</a></li><li>• <a href="#">Configuring Unicast RPF Loose Mode on page 221</a></li><li>• <a href="#">Example: Configuring Unicast Reverse-Path-Forwarding Check on page 226</a></li><li>• <a href="#">Configuring a Pseudowire Subscriber Logical Interface Device</a></li></ul> |



## rpf-loose-mode-discard

|                                 |                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>rpf-loose-mode-discard {     family {         inet;         inet6;     } }</pre>                                                                            |
| <b>Hierarchy Level</b>          | [edit forwarding-options]                                                                                                                                        |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                             |
| <b>Description</b>              | Configure unicast reverse path forwarding (unicast RPF) loose mode with the ability to discard packets with the source address pointing to the discard next hop. |
| <b>Options</b>                  | <p><b>inet</b>—IPv4 address family.</p> <p><b>inet6</b>—IPv6 address family.</p>                                                                                 |
| <b>Required Privilege Level</b> | <p>interface-control—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Unicast RPF on page 217</a></li> </ul>                                                          |

## rtp

|                                 |                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>rtp {     f-max-period <i>number</i>;     queues [ <i>queue-numbers</i> ];     port {         minimum <i>port-number</i>;         maximum <i>port-number</i>;     } }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>compression</b> ]                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                |
| <b>Description</b>              | <p>Configure the real-time transport protocol (RTP) properties for voice services traffic.</p> <p>The remaining statements are described separately.</p>                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                              |

## rts

---

|                                 |                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | rts (assert   de-assert   normal);                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                     |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the to-DCE signal, request to send (RTS).                                                                                                                                             |
| <b>Options</b>                  | <b>assert</b> —The to-DCE signal must be asserted.<br><br><b>de-assert</b> —The to-DCE signal must be deasserted.<br><br><b>normal</b> —Normal RTS signal handling, as defined by the TIA/EIA Standard 530.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li></ul>                                                                                                                  |

## rts-polarity

---

|                                 |                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | rts-polarity (negative   positive);                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                        |
| <b>Description</b>              | Configure RTS signal polarity.                                                                                           |
| <b>Options</b>                  | <b>negative</b> —Negative signal polarity.<br><br><b>positive</b> —Positive signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li></ul>       |

## rtvbr

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>rtvbr peak rate sustained rate burst length;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ]</p>                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>For ATM2 IQ PICs only, define the real-time variable bandwidth utilization in the traffic-shaping profile.</p> <p>When you configure the real-time bandwidth utilization, you must specify all three options (<b>burst</b>, <b>peak</b>, and <b>sustained</b>). You can specify the rate in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify the rate in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second using the formula 1 cps = 384 bps.</p>                                                                                                                                                                                      |
| <b>Default</b>                  | If the <b>rtvbr</b> statement is not included, bandwidth utilization is unlimited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>burst length</b>—Burst length, in cells. If you set the length to 1, the peak traffic rate is used.<br/> <b>Range:</b> 1 through 4000 cells</p> <p><b>peak rate</b>—Peak rate, in bits per second or cells per second.<br/> <b>Range:</b> For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure..</p> <p><b>sustained rate</b>—Sustained rate, in bps or cps.<br/> <b>Range:</b> For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM CBR</i></li> <li>• <i>Configuring ATM2 IQ Real-Time VBR</i></li> <li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

- [cbr on page 445](#)
- [vbr on page 925](#)

## sa-multicast (100-Gigabit Ethernet)

|                            |                                                                                                                      |
|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | sa-multicast;                                                                                                        |
| <b>Hierarchy Level</b>     | [edit chassis fpc slot pic slot forwarding-mode]                                                                     |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.4.                                                                       |
| <b>Description</b>         | Configure the 100-Gigabit Ethernet PIC or MIC to interoperate with other Juniper Networks 100-Gigabit Ethernet PICs. |



**NOTE:** The default packet steering mode for PD-ICE-CFP-FPC4 is SA multicast bit mode. No SA multicast configuration is required to enable this mode.

sa-multicast supports interoperability between the following PICs and MICs:

- 100-Gigabit Ethernet Type 5 PIC with CFP (PF-1CGE-CFP) and the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4) .
- 100-Gigabit Ethernet MICs and the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4).

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <i>Interoperability Between the 100-Gigabit Ethernet PICs PD-ICE-CFP-FPC4 and PF-1CGE-CFP</i></li> <li>• <i>Configuring the Interoperability Between the 100-Gigabit Ethernet PICs PF-1CGE-CFP and PD-ICE-CFP-FPC4</i></li> <li>• <i>Configuring 100-Gigabit Ethernet MICs to Interoperate with Type 4 100-Gigabit Ethernet PICs (PD-ICE-CFP-FPC4) Using SA Multicast Mode</i></li> <li>• <i>Interoperability Between MPC4E (MPC4E-3D-2CGE-8XGE) and 100-Gigabit Ethernet PICs on Type 4 FPC</i></li> <li>• <i>Configuring MPC4E (MPC4E-3D-2CGE-8XGE) to Interoperate with 100-Gigabit Ethernet PICs on Type 4 FPC Using SA Multicast Mode</i></li> <li>• <i>Interoperability Between the 100-Gigabit Ethernet PICs PD-ICE-CFP-FPC4 and P1-PTX-2-100GE-CFP</i></li> <li>• <i>Configuring the Interoperability Between the 100-Gigabit Ethernet PICs P1-PTX-2-100GE-CFP and PD-ICE-CFP-FPC4</i></li> <li>• <i>forwarding-mode (100-Gigabit Ethernet)</i></li> <li>• <i>sa-multicast (PTX Series Packet Transport Routers)</i></li> <li>• <a href="#">vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP) on page 939</a></li> </ul> |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- *Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP*

## sampling (Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>sampling <i>direction</i>;</code>                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit <code>interfaces interface-name unit logical-unit-number family</code> inet],<br>[edit logical-systems <code>logical-system-name interfaces interface-name unit logical-unit-number family</code> inet]                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Configure the direction of traffic to be sampled.                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><i>direction</i> can be one of the following:</p> <p><b>input</b>—Configure at least one expected ingress point.</p> <p><b>output</b>—Configure at least one expected egress point.</p> <p><b>input output</b>—On a single interface, configure at least one expected ingress point and one expect egress point.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Configuring Flow Monitoring</i></li></ul>                                                                                                                                                          |

## satop-options

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> satop-options {     excessive-packet-loss-rate {         apply-groups <i>group-name</i>         apply-groups-except <i>group-name</i>         groups <i>group-name</i>         sample-period <i>milliseconds</i>         threshold <i>percentile</i>     }     idle-pattern <i>pattern</i>     jitter-buffer-auto-adjust     jitter-buffer-latency <i>milliseconds</i>     jitter-buffer-packets <i>packets</i>     payload-size <i>bytes</i>; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>         | <p>Set Structure-Agnostic TDM over Packet (SAToP) protocol options.</p> <p>On ACX Series routers, the following statements are not supported:</p> <pre>     apply-groups <i>group-name</i>     apply-groups-except <i>group-name</i>     groups <i>group-name</i>     jitter-buffer-auto-adjust </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>             | <p><b>excessive-packet-loss-rate options</b>—Set packet loss options.</p> <ul style="list-style-type: none"> <li><b>apply-groups <i>group-name</i></b>—Groups from which to inherit configuration data.</li> <li><b>apply-groups-except <i>group-name</i></b>—Don't inherit configuration data from these groups.</li> <li><b>groups <i>group-name</i></b>—Specify groups.</li> <li><b>sample-period <i>milliseconds</i></b>—Number of milliseconds over which excessive packet loss rate is calculated.</li> <li><b>threshold <i>percentile</i></b>—Percentile designating the threshold of excessive packet loss rate (from 1 to 100).</li> </ul> <p><b>idle-pattern <i>pattern</i></b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 to 255).</p> <p><b>jitter-buffer-auto-adjust</b>—Automatically adjust the jitter buffer.</p> |



**NOTE:** This option is not applicable on MX Series routers.

**jitter-buffer-latency *milliseconds***—Number of milliseconds delay in jitter buffer (from 1 to 1000 milliseconds).

**jitter-buffer-packets *packets***—Number of packets in jitter buffer (from 1 to 64).

**payload-size *bytes***—Payload size in integer number of bytes.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring SAToP on 4-Port Channelized OC3/STM1 Circuit Emulation MICs*
- *Configuring SAToP Emulation on T1/E1 Interfaces on 12-Port Channelized T1/E1 Circuit Emulation PICs*
- *ATM Support on Circuit Emulation PICs Overview*

---

## shared-interface

---

**Syntax** shared-interface;

**Hierarchy Level** [edit interfaces *ge-fpc/pic/slot*],  
[edit interfaces *so-fpc/pic/slot*],  
[edit interfaces *xe-fpc/pic/slot*]

**Release Information** Statement introduced in Junos OS Release 9.3.

**Description** Configure a physical interface to be a shared interface. Logical interfaces configured under the shared physical interface can be assigned to different Protected System Domains (PSDs).

**Options** This statement has no options.

**Required Privilege Level** view-level—To view this statement in the configuration.  
control-level—To add this statement to the configuration.

**Related Documentation**

- [interface-shared-with on page 611](#)



## scheduler-maps (For ATM2 IQ Interfaces)

|                                 |                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>scheduler-maps <i>map-name</i> {     forwarding-class (<i>class-name</i>   assured-forwarding   best-effort   expedited-forwarding       network-control);     vc-cos-mode (alternate   strict); }</pre>                |
| <b>Hierarchy Level</b>          | [edit at- <i>fpc/pic/port interface-name</i> <a href="#">atm-options</a> ]                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                            |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS parameters assigned to forwarding classes.                                                                                                                                           |
| <b>Options</b>                  | <p><i>map-name</i>—Name of the scheduler map.</p> <p>The remaining statements are explained separately.</p>                                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> <li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li> <li>• <a href="#">atm-scheduler-map on page 417</a></li> </ul> |

## schedulers

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | schedulers <i>number</i> ;                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.                                                                                      |
| <b>Description</b>              | Specify the number of schedulers for Ethernet IQ2 and IQ2-E PIC port interfaces.                                                   |
| <b>Default</b>                  | If you omit this statement, the 1024 schedulers are distributed equally over all ports in multiples of 4.                          |
| <b>Options</b>                  | <p><i>number</i>—Number of schedulers to configure on the port.</p> <p><b>Range:</b> 1 through 1024</p>                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Class of Service Feature Guide for Routing Devices</i></li> </ul>                      |

## secondary

---

|                                 |                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>secondary interface-name;</code>                                                                                                            |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> (rsp0   rsp1) <a href="#">redundancy-options</a> ]                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                 |
| <b>Description</b>              | Specify the secondary (backup) AS PIC interface or MultiServices PIC interface.                                                                   |
| <b>Options</b>                  | <i>interface-name</i> —The identifier for the AS PIC interface or MultiServices PIC interface, which must be of the form <i>sp-fpc/pic/port</i> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                 |

## send-critical-event

---

|                                 |                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>send-critical-event;</code>                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile action</a> ]                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                |
| <b>Description</b>              | Send OAM PDUs with the critical event bit set.                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul> |

## serial-options

```
Syntax serial-options {
 clock-rate rate;
 clocking-mode (dce | loop);
 control-polarity (negative | positive);
 cts-polarity (negative | positive);
 dcd-polarity (negative | positive);
 dce-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
 }
 dsr-polarity (negative | positive);
 dte-options {
 control-signal (assert | de-assert | normal);
 cts (ignore | normal | require);
 dcd (ignore | normal | require);
 dsr (ignore | normal | require);
 dtr signal-handling-option;
 ignore-all;
 indication (ignore | normal | require);
 rts (assert | de-assert | normal);
 tm (ignore | normal | require);
 }
 dtr-circuit (balanced | unbalanced);
 dtr-polarity (negative | positive);
 encoding (nrz | nrzi);
 indication-polarity (negative | positive);
 line-protocol protocol;
 loopback (dce-local | dce-remote | local | remote);
 rts-polarity (negative | positive);
 tm-polarity (negative | positive);
 transmit-clock invert;
 }
```

**Hierarchy Level** [edit interfaces *se-pim*/0/*port*]

**Release Information** Statement introduced prior to Junos OS Release 7.4.

**Description** Configure serial-specific interface properties.

The statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

- Related Documentation**
- [Serial Interfaces Overview on page 293](#)
  - *no-concatenate*

---

## server

|                                 |                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | server;                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                            |
| <b>Description</b>              | Configure the router to operate in the PPPoE server mode. Supported on M120 and M320 Multiservice Edge Routers and MX Series Universal Edge Routers operating as access concentrators.                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the PPPoE Server Mode</i></li></ul>                                                                                                                               |

---

## server-timeout

|                                 |                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | server-timeout <i>seconds</i> ;                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Sets the number of seconds the port waits for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.                                                                                            |
| <b>Options</b>                  | <b>seconds</b> —The number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 30 seconds                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 420</a></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li></ul> |

## service (Logical Interfaces)

|                                 |                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> service {   input {     service-set service-set-name &lt;service-filter filter-name&gt;;     post-service-filter filter-name;   }   output {     service-set service-set-name &lt;service-filter filter-name&gt;;   } } </pre>                                               |
| <b>Hierarchy Level</b>          | <p>[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                  |
| <b>Description</b>              | Define one or more service sets and filters, and one postservice filter to be applied to an interface.                                                                                                                                                                             |
| <b>Options</b>                  | The remaining statements are explained separately.                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                |

## service (PPPoE)

---

**Syntax**    `service service-name {`  
              `drop;`  
              `delay seconds;`  
              `terminate;`  
              `dynamic-profile profile-name;`  
              `routing-instance routing-instance-name;`  
              `max-sessions number;`  
              `agent-specifier {`  
                  `aci circuit-id-string ari remote-id-string {`  
                      `drop;`  
                      `delay seconds;`  
                      `terminate;`  
                      `dynamic-profile profile-name;`  
                      `routing-instance routing-instance-name;`  
                      `static-interface interface-name;`  
                  `}`  
              `}`  
          `}`

**Hierarchy Level**    [edit protocols pppoe `service-name-tables table-name`]

**Release Information**    Statement introduced in Junos OS Release 10.0.  
                              **any**, **dynamic-profile**, **routing-instance**, **max-sessions**, and **static-interface** options introduced in Junos OS Release 10.2.

**Description**    Specify the action taken by the interface on receipt of a PPPoE Active Discovery Initiation (PADI) control packet for the specified named service, **empty** service, or **any** service in a PPPoE service name table. You can also specify the dynamic profile and routing instance that the router uses to instantiate a dynamic PPPoE interface, and the maximum number of active PPPoE sessions that the router can establish with the specified service.

**Default**    The default action is terminate.

**Options**    **service-name**—Service entry in the PPPoE service name table:

- **service-name**—Named service entry of up to 32 characters; for example, **premiumService**. You can configure a maximum of 512 named service entries across all PPPoE service name tables on the router.
- **empty**—Service entry of zero length that represents an unspecified service. Each PPPoE service name table includes one **empty** service entry by default.
- **any**—Default service for non-empty service entries that do not match the named or **empty** service entries configured in the PPPoE service name table. Each PPPoE service name table includes one **any** service entry by default.

The remaining statements are explained separately.

**Required Privilege Level**    interface—To view this statement in the configuration.  
                                  interface-control—To add this statement to the configuration.

- Related Documentation**
- *Configuring PPPoE Service Name Tables*
  - *Assigning a Service to a Service Name Table and Configuring the Action Taken When the Client Request Includes a Non-zero Service Name Tag*
  - *Configuring the Action Taken When the Client Request Includes an Empty Service Name Tag*
  - *Configuring the Action Taken for the Any Service*

## service-domain

|                                 |                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | service-domain (inside   outside);                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | For adaptive services interfaces, specify a service interface domain. If you specify this interface using the <b>next-hop-service</b> statement at the [edit <b>services service-set service-set-name</b> ] hierarchy level, the interface domain must match that used with the <b>inside-service-interface</b> and <b>outside-service-interface</b> statements. |
| <b>Options</b>                  | <b>inside</b> —Interface used within the network.<br><br><b>outside</b> —Interface used outside the network.                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | • <i>Junos OS Services Interfaces Library for Routing Devices</i>                                                                                                                                                                                                                                                                                                |


## service-filter (Interfaces)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>service-filter <i>filter-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> ( <b>input</b>   <b>output</b> ) <b>service-set</b> <i>service-set-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> ( <b>input</b>   <b>output</b> ) <b>service-set</b> <i>service-set-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Define the filter to be applied to traffic before it is accepted for service processing. Configuration of a service filter is optional; if you include the <b>service-set</b> statement without a <b>service-filter</b> definition, Junos OS assumes the match condition is true and selects the service set for processing automatically.                                                                                                                      |
| <b>Options</b>                  | <b><i>filter-name</i></b> —Identifies the filter to be applied in service processing. You can include special characters, such as a forward slash (/), colon (:), or a period (.).                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Applying Filters and Services to Interfaces</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                  |



## service-name-table

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                            | <code>service-name-table <i>table-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>                                                                                                                                                                                   | <p>[edit dynamic-profiles <i>profile-name</i> interfaces demux0 unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">pppoe-underlying-options</a>]</p> |
| <b>Release Information</b>                                                                                                                                                                               | <p>Statement introduced in Junos OS Release 10.0.</p> <p>Support at the [edit ... family pppoe] hierarchies introduced in Junos OS Release 11.2.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                                                                                                                                                                       | Specify the PPPoE service name table assigned to a PPPoE underlying interface. This underlying interface is configured with either the <b>encapsulation ppp-over-ether</b> statement or the <b>family pppoe</b> statement; the two statements are mutually exclusive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <div>  <b>NOTE:</b> The [edit ... family pppoe] hierarchies are supported only on MX Series routers with MPCs. </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                                                                                                                                                                                           | <b><i>table-name</i></b> —Name of the PPPoE service name table, a string of up to 32 alphanumeric characters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                                                                                                                                                                          | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Configuring PPPoE Service Name Tables</li> <li>Assigning a Service Name Table to a PPPoE Underlying Interface</li> <li>Configuring the PPPoE Family for an Underlying Interface</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## service-name-tables

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>service-name-tables <i>table-name</i> {<br/>    service <i>service-name</i> {<br/>        drop;<br/>        delay <i>seconds</i>;<br/>        terminate;<br/>        dynamic-profile <i>profile-name</i>;<br/>        routing-instance <i>routing-instance-name</i>;<br/>        max-sessions <i>number</i>;<br/>        agent-specifier {<br/>            aci <i>circuit-id-string</i> ari <i>remote-id-string</i> {<br/>                drop;<br/>                delay <i>seconds</i>;<br/>                terminate;<br/>                dynamic-profile <i>profile-name</i>;<br/>                routing-instance <i>routing-instance-name</i>;<br/>                static-interface <i>interface-name</i>;<br/>            }<br/>        }<br/>    }<br/>}</pre> |
| Hierarchy Level          | [edit protocols pppoe]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Release Information      | Statement introduced in Junos OS Release 10.0.<br><b>dynamic-profile</b> , <b>routing-instance</b> , <b>max-sessions</b> , and <b>static-interface</b> options introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description              | Create and configure a PPPoE service name table. Specify the action taken for each service and remote access concentrator on receipt of a PPPoE Active Discovery Initiation (PADI) packet. You can also specify the dynamic profile and routing instance that the router uses to instantiate a dynamic PPPoE interface, and the maximum number of active PPPoE sessions that the router can establish with the specified service. A maximum of 32 PPPoE service name tables is supported per router.                                                                                                                                                                                                                                                                        |
| Options                  | <b>table-name</b> —Name of the PPPoE service name table, a string of up to 32 alphanumeric characters.<br><br>The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Related Documentation    | <ul style="list-style-type: none"><li>Configuring PPPoE Service Name Tables</li><li>Creating a Service Name Table</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## service-set

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>service-set service-set-name;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <p>[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> (<b>input</b>   <b>output</b>) <b>service-set</b> <i>service-set-name</i>],</p> <p>[edit <b>logical-systems</b> <i>logical-system-name</i> <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> (<b>input</b>   <b>output</b>) <b>service-set</b> <i>service-set-name</i>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Define one or more service sets to be applied to an interface. If you define multiple service sets, the Junos OS evaluates the filters in the order in which they appear in the configuration.                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b>service-set-name</b> —Identifies the service set.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                |

## services (Priority Level)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>services priority-level;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">services-options</a> <a href="#">sysloghost</a> <i>hostname</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Specify system logging priority level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><i>priority-level</i>—Assigns a priority level to the facility. Valid entries are as follows:</p> <ul style="list-style-type: none"><li>• <b>alert</b>—Conditions that should be corrected immediately.</li><li>• <b>any</b>—Matches any level.</li><li>• <b>emergency</b>—Panic conditions.</li><li>• <b>critical</b>—Critical conditions.</li><li>• <b>error</b>—Error conditions.</li><li>• <b>info</b>—Informational messages.</li><li>• <b>notice</b>—Conditions that require special handling.</li><li>• <b>warning</b>—Warning messages.</li></ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## services-options

**Syntax**

```

services-options {
 inactivity-timeout seconds;
 open-timeout seconds;
 session-limit {
 maximum number;
 rate new-sessions-per-second;
 }
 syslog {
 host hostname {
 facility-override facility-name;
 log-prefix prefix-number;
 services priority-level;
 }
 }
}

```

**Hierarchy Level** [edit [interfaces](#) *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Define the service options to be applied on an interface.

**Options** The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related Documentation**

- *Junos OS Services Interfaces Library for Routing Devices*

## shaping

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>shaping {<br/>  (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst<br/>  length);<br/>  queue-length number;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces interface-name atm-options vpi vpi-identifier],<br/>[edit interfaces interface-name unit logical-unit-number],<br/>[edit interfaces interface-name unit logical-unit-number address address family family<br/>multipoint-destination address],<br/>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number],<br/>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number<br/>address address family family multipoint-destination address]</pre> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For ATM encapsulation only, define the traffic-shaping profile.</p> <p>For Circuit Emulation PICs, specify traffic shaping in the ingress and egress directions.</p> <p>For ATM2 IQ interfaces, changing or deleting VP tunnel traffic shaping causes all logical interfaces on a VP to be deleted and then re-added.</p> <p>VP tunnels are not supported on multipoint interfaces.</p> <p>The statements are explained separately.</p>                                                                                                       |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Defining Virtual Path Tunnels</i></li><li>• <i>Defining the ATM Traffic-Shaping Profile Overview</i></li><li>• <i>Configuring ATM QoS or Shaping</i></li><li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li></ul>                                                                                                                                                                                                                                                                     |

## short-name-format

|                            |                                                                                                                                                                                                                                                                                                        |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | short-name-format (character-string   vlan   2octet   rfc-2685-vpn-id);                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>     | [edit protocols oam ethernet connectivity-fault-management maintenance-domain domain-name <b>maintenance-association</b> ma-name]                                                                                                                                                                      |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                                                                                             |
| <b>Description</b>         | Specify the name format of the maintenance association name.                                                                                                                                                                                                                                           |
| <b>Options</b>             | <p><b>character-string</b>—The name is an ASCII character string.</p> <p><b>vlan</b>—The primary VLAN identifier.</p> <p><b>2octet</b>—A number in the range 0 through 65,535.</p> <p><b>rfc-2685-vpn-id</b>—A VPN identifier that complies with RFC 2685.</p> <p><b>Default:</b> character-string</p> |



**NOTE:** The PTX Series Packet Transport Routers support the vlan and 2octet options only.

|                                 |                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |

## short-sequence

---

|                                 |                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | short-sequence;                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                |
| <b>Description</b>              | For multilink interfaces only, set the length of the packet sequence identification number to 12 bits.                                                                                           |
| <b>Default</b>                  | If you omit this statement from the configuration, the length is set to 24 bits.                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                |



## sla-iterator-profile

---

|                                 |                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | sla-iterator-profile <i>profile-name</i> {<br>data-tlv-size <i>size</i> ;<br>iteration-count <i>count-value</i> ;<br>priority <i>priority-value</i> ;<br>}                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain</a><br><i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> <a href="#">remote-mep</a> <i>remote-mep-id</i> ]                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Configure a remote MEP with an iterator profile and specify the options.                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b><i>profile-name</i></b>—Name of the iterator profile configured for a remote MEP. For more information about configuring a remote MEP with an iterator profile, see <i>Configuring a Remote MEP with an Iterator Profile</i>.</p> <p>The remaining statements are explained separately.</p>                                               |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> <li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li> <li>• <i>Verifying the Configuration of an Iterator Profile</i></li> <li>• <i>Managing Iterator Statistics</i></li> <li>• <a href="#">sla-iterator-profiles on page 848</a></li> </ul> |

## sla-iterator-profiles

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>sla-iterator-profiles {<br/>  profile-name {<br/>    avg-fd-twoway-threshold;<br/>    avg-ifdv-twoway-threshold;<br/>    avg-flr-forward-threshold;<br/>    avg-flr-backward-threshold;<br/>    calculation-weight {<br/>      delay delay-weight;<br/>      delay-variation delay-variation-weight;<br/>    }<br/>    cycle-time milliseconds;<br/>    iteration-period iteration-period-value;<br/>    measurement-type (loss   statistical-frame-loss   two-way-delay);<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> ]                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Configure an iterator application and specify the iterator profile options.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>profile-name</b>—Name of the iterator profile. For more information about configuring the iterator profile, see <i>Configuring an Iterator Profile</i>.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li><li>• <i>Verifying the Configuration of an Iterator Profile</i></li><li>• <i>Managing Iterator Statistics</i></li></ul>                                                                                                                                                                                                                       |

## sonet-options

```
Syntax sonet-options {
 aps {
 advertise-interval milliseconds;
 annex-b
 authentication-key key;
 (break-before-make | no-break-before-make);
 fast-aps-switch;
 force;
 hold-time milliseconds;
 lockout;
 neighbor address;
 paired-group group-name;
 protect-circuit group-name;
 request;
 revert-time seconds;
 switching-mode (bidirectional | unidirectional);
 working-circuit group-name;
 }
 bytes {
 c2 value;
 e1-quiet value;
 f1 value;
 f2 value;
 s1 value;
 z3 value;
 z4 value;
 }
 fcs (16 | 32);
 loopback (local | remote);
 mpls {
 pop-all-labels {
 required-depth number;
 }
 }
 path-trace trace-string;
 (payload-scrambler | no-payload-scrambler);
 rfc-2615;
 trigger {
 defect ignore;
 defect hold-time up milliseconds down milliseconds;
 }
 }
 vtmapping (itu-t | klm);
 (z0-increment | no-z0-increment);
```

**Hierarchy Level** [edit interfaces *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure SONET/SDH-specific interface properties.

On SONET/SDH OC48 interfaces that you configure for channelized (multiplexed) mode (by including the **no-concatenate** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level), the **bytes e1-quiet** and **bytes f1** options have no effect. The **bytes f2**, **bytes z3**, **bytes z4**, and **path-trace** options work correctly on channel 0 and work in the transmit direction only on channels 1, 2, and 3.

On a channelized OC12 interface, the **bytes e1-quiet**, **bytes f1**, **bytes f2**, **bytes z3**, and **bytes z4** options are not supported. The **fcs** and **payload-scrambler** statements are also not supported; you must configure these for each DS3 channel using the **t3-options fcs** and **t3-options payload-scrambler** statements. The **aps** and **loopback** statements are supported only on channel 0 and are ignored if included in the configurations for channels 1 through 11. You can configure loopbacks for each DS3 channel with the **t3-options loopback** statement. The **path-trace** statement can be included in the configuration for each DS3 channel, thereby configuring a unique path trace for each channel.

To configure loopback on channelized IQ and IQE PICs, SONET/SDH level, use the **loopback** statement **local** and **remote** options at the controller interface (coc48, cstm16, coc12, cstm4, coc3, and cstm1). It is ignored for path-level interfaces **so-fpc/pic/port** or **so-fpc/pic/port:channel**.

If you are running Intermediate System-to-Intermediate System (IS-IS) over SONET/SDH interfaces, use PPP if you are running Cisco IOS Release 12.0 or later. If you need to run HDLC, configure an ISO family MTU of 4469 on the router.

The statements are explained separately.

|                                 |                                                               |
|---------------------------------|---------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.        |
|                                 | interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | • <i>Configuring SONET/SDH Parameters on ATM Interfaces</i>   |
|                                 | • <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i> |
|                                 | • <i>Channelized STM1 Interfaces Overview</i>                 |
|                                 | • <i>SONET/SDH Interfaces Overview</i>                        |
|                                 | • <i>no-concatenate</i>                                       |

## source

---

|                                 |                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>source source-address;</code>                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>tunnel</b> <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                 |
| <b>Description</b>              | Specify the source address of the tunnel.                                                                                                                                                                                                                         |
| <b>Default</b>                  | If you do not specify a source address, the tunnel uses the unit's primary address as the source address of the tunnel.                                                                                                                                           |
| <b>Options</b>                  | <b>source-address</b> —Address of the local side of the tunnel. This is the address that is placed in the outer IP header's source field.                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">multicast-only on page 690</a></li> <li>• <a href="#">primary (Address on Interface) on page 789</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## source-address-filter

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | source-address-filter {<br><code>mac-address</code> ;<br>}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description              | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, Gigabit Ethernet IQ interfaces, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), specify the MAC addresses from which the interface can receive packets. For this statement to have any effect, you must include the <b>source-filtering</b> statement in the configuration to enable source address filtering.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Options                  | <p><b>mac-address</b>—MAC address filter. You can specify the MAC address as <i>nn:nn:nn:nn:nn:nn</i> or <i>nnnn.nnnn.nnnn</i>, where <i>n</i> is a decimal digit. To specify more than one address, include multiple <b>mac-address</b> options in the <b>source-address-filter</b> statement.</p> <p>If you enable the VRRP on a Fast Ethernet or Gigabit Ethernet interface, as described in <i>VRRP and VRRP for IPv6 Overview</i>, and if you enable MAC source address filtering on the interface, you must include the virtual MAC address in the list of source MAC addresses that you specify in the <b>source-address-filter</b> statement. MAC addresses ranging from <b>00:00:5e:00:01:00</b> through <b>00:00:5e:00:01:ff</b> are reserved for VRRP, as defined in RFC 3768, <i>Virtual Router Redundancy Protocol</i>. When you configure the VRRP group, the group number must be the decimal equivalent of the last hexadecimal byte of the virtual MAC address.</p> <p>On untagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement simultaneously. On tagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement with an identical MAC address specified in both filters.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering for Ethernet Interfaces</i></li><li>• <i>Configuring MAC Address Filtering on PTX Series Packet Transport Routers</i></li><li>• <a href="#">source-filtering on page 724</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## source-class-usage

|                                 |                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | source-class-usage {<br><i>direction</i> ;<br>}                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit routing-instances <i>routing-instance-name</i> vrf-table-label]     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for the <b>vrf-table-label</b> statement added in Junos OS Release 9.3.                                                                                                                                                                                                                            |
| <b>Description</b>              | Enable packet counters on an interface that count packets that arrive from specific prefixes on the provider core router and are destined for specific prefixes on the customer edge router.                                                                                                                                                                    |
| <b>Options</b>                  | <i>direction</i> can be one of the following:<br><br><b>input</b> —Configure at least one expected ingress point.<br><br><b>output</b> —Configure at least one expected egress point.<br><br><b>input output</b> —On a single interface, configure at least one expected ingress point and one expect egress point.                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 235</a></li> <li>• <a href="#">accounting on page 389</a></li> <li>• <a href="#">destination-class-usage on page 489</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>vrf-table-label</i></li> </ul> |

## source-filtering

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (source-filtering   no-source-filtering);                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and Gigabit Ethernet IQ interfaces only, enable the filtering of MAC source addresses, which blocks all incoming packets to that interface. To allow the interface to receive packets from specific MAC addresses, include the <b>source-address-filter</b> statement.</p> <p>If the remote Ethernet card is changed, the interface is no longer able to receive packets from the new card because it has a different MAC address.</p> |
| <b>Default</b>                  | Source address filtering is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering for Ethernet Interfaces</i></li><li>• <i>Configuring MAC Address Filtering on PTX Series Packet Transport Routers</i></li><li>• <a href="#">accept-source-mac on page 386</a></li><li>• <a href="#">source-address-filter on page 852</a></li></ul>                                                                                                                                                                    |




## speed (Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>speed (10m   100m   1g   auto   auto-10m-100m);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>ge-pim</i>/0/0 <i>switch-options</i> <i>switch-port</i> <i>port-number</i>]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Configure the interface speed. This statement applies to the management Ethernet interface (<b>fxp0</b> or <b>em0</b>), Fast Ethernet 12-port and 48-port PICs, the built-in Fast Ethernet port on the FIC (M7i router), Combo Line Rate DPCs and Tri-Rate Ethernet Copper interfaces on MX Series routers, and Gigabit Ethernet interfaces on EX Series switches.</p> <p>When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled. When you configure 100BASE-FX SFP, you must set the port speed at 100 Mbps.</p>                                                                                                                                                             |
| <b>Options</b>                  | <p>You can specify the speed as either <b>10m</b> (10 Mbps), <b>100m</b> (100 Mbps), and on MX Series routers, <b>1g</b> (1 Gbps). You can also specify the <b>auto</b> option on MX Series routers.</p> <p>For Gigabit Ethernet interfaces on EX Series switches, you can specify one of the following options:</p> <ul style="list-style-type: none"> <li>• <b>10m</b>—10 Mbps</li> <li>• <b>100m</b>—100 Mbps</li> <li>• <b>1g</b>—1 Gbps</li> <li>• <b>auto</b>—Automatically negotiate the speed (10 Mbps, 100 Mbps, or 1 Gbps) based on the speed of the other end of the link.</li> <li>• <b>auto-10m-100m</b>—Automatically negotiate the speed (10 Mbps or 100 Mbps) based on the speed of the other end of the link.</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Speed on page 105</a></li> <li>• <a href="#">Configuring the Interface Speed on Ethernet Interfaces on page 105</a></li> <li>• <a href="#">Configuring Gigabit Ethernet Autonegotiation</a></li> <li>• <a href="#">Configuring Gigabit Ethernet Interfaces (CLI Procedure)</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |

## speed (MX Series DPC)

---

|                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                               | <code>speed (auto   1Gbps   100Mbps   10Mbps);</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                      | [edit interfaces <i>ge-fpc/pic/port</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                                                                                                                                                                                                                  | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>                                                                                                                                                                                                                          | On MX Series routers with Combo Line Rate DPCs and Tri-Rate Copper SFPs you can set auto negotiation of speed. To specify the auto negotiation speed, use the <b>speed (auto   1Gbps   100Mbps   10Mbps)</b> statement under the [edit interface <i>ge-/fpc/pic/port</i> ] hierarchy level. The <b>auto</b> option will attempt to automatically match the rate of the connected interface. To set port speed negotiation to a specific rate, set the port speed to <b>1Gbps</b> , <b>100Mbps</b> , or <b>10Mbps</b> . |
| <div> <b>NOTE:</b> If the negotiated speed and the interface speed do not match, the link will not be brought up. Half duplex mode is not supported.</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                                                                                                                                                                                                              | You can specify the speed as either <b>auto</b> (autonegotiate), <b>10Mbps</b> (10 Mbps), <b>100Mbps</b> (100 Mbps), or <b>1Gbps</b> (1 Gbps).                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                                                                                                                                                                                                             | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Autonegotiation</i></li><li>• <a href="#">no-auto-mdix on page 708</a></li></ul>                                                                                                                                                                                                                                                                                                                                                               |

## speed (SONET/SDH)

|                                 |                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>speed (oc3   oc12   oc48);</code>                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <code>[edit interfaces so-<i>fpc/pic/port</i>],</code><br><code>[edit interfaces so-<i>fpc/pic/port:channel</i>]</code>                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Configure the interface speed. This statement applies to SONET/SDH interfaces on next-generation SONET/SDH Type 1 and Type 2 PICs with SFP. Available speeds depend on whether the PIC is in concatenated mode or nonconcatenated mode. Include the channel in the interface name when configuring nonconcatenated interfaces.        |
| <b>Options</b>                  | <p><b>oc3   oc12   oc48</b>—Speed when the PIC is in concatenated mode. For example, you can configure each port of a 4-port OC12 PIC to have a speed of <b>oc3</b>.</p> <p>You can configure port 0 of a 4-port OC12 PIC to have a speed of <b>oc12</b>.</p> <p><b>oc3   oc12</b>—Speed when the PIC is in nonconcatenated mode.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring SONET/SDH Interface Speed on page 108</a></li> </ul>                                                                                                                                                                                                                 |

## spid1

|                                 |                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>spid1 <i>spid1-string</i>;</code>                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <code>[edit interfaces br-<i>pim</i>/0/<i>port</i> isdn-options]</code>                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                 |
| <b>Description</b>              | Configure the Service Profile Identifier (SPID).                                                                                                                                                  |
| <b>Options</b>                  | <b><i>spid1-string</i></b> —Numeric SPID.                                                                                                                                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ISDN Physical Interface Properties</a></li> <li>• <a href="#">Junos OS Interfaces and Routing Configuration Guide</a></li> </ul> |

## spid2

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>spid2 <i>spid2-string</i>;</code>                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /0/ <i>port</i> isdn-options]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                       |
| <b>Description</b>              | Configure an additional SPID.                                                                                           |
| <b>Options</b>                  | <i>spid2-string</i> —Numeric SPID.                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li></ul>                 |

## stacked-vlan-ranges

```
Syntax stacked-vlan-ranges {
 access-profile profile-name;
 authentication {
 packet-types [packet-types];
 password password-string;
 username-include {
 circuit-type;
 delimiter delimiter-character;
 domain-name domain-name-string;
 interface-name;
 mac-address;
 option-18
 option-37
 option-82;
 radius-realm radius-realm-string;
 user-prefix user-prefix-string;
 }
 }
 dynamic-profile profile-name {
 accept (any | dhcp-v4 | inet);
 ranges (any | low-tag-high-tag), (any | low-tag-high-tag);
 }
 override;
 }
```

**Hierarchy Level** [edit interfaces *interface-name* [auto-configure](#)]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.

The remaining statements are explained separately.


**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs*
- *Configuring Interfaces to Support Both Single and Stacked VLANs*

## stacked-vlan-tagging

---

|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                 | stacked-vlan-tagging;                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>                                                                                                                                        | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                                                                                                                                    | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                              |
| <b>Description</b>                                                                                                                                            | <p>For Gigabit Ethernet IQ interfaces, Gigabit Ethernet, 10-Gigabit Ethernet LAN/WAN PIC, and 100-Gigabit Ethernet Type 5 PIC with CFP, enable stacked VLAN tagging for all logical interfaces on the physical interface.</p> <p>For pseudowire subscriber interfaces, enable stacked VLAN tagging for logical interfaces on the pseudowire service.</p> |
| <div> <b>NOTE:</b> This statement is not supported on PTX1000 routers.</div> |                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b>                                                                                                                               | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>                                                                                                                                  | <ul style="list-style-type: none"><li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i></li><li>• <a href="#">vlan-tags (Stacked VLAN Tags) on page 943</a></li></ul>                                                                                                                                                                  |

## start-end-flag

|                            |                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | start-end-flag (filler   shared);                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>     | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> e3-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> t3-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                               |
| <b>Description</b>         | For DS0, E1, E3, T1, and T3 interfaces, configure the interface to share the transmission of start and end flags.                                                                                                                                                                                                                                                             |



**NOTE:** When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the start-end-flag statement must be included at the [edit interfaces e1-*fpc/pic/port*] or [edit interfaces t1-*fpc/pic/port*] hierarchy level as appropriate.

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <p><b>filler</b>—Wait two idle cycles between the start and end flags.</p> <p><b>shared</b>—Share the transmission of the start and end flags. This is the default.</p>                                                                                          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E1 Start and End Flags</i></li> <li>• <i>Configuring the E3 Start and End Flags</i></li> <li>• <i>Configuring T1 Start and End Flags</i></li> <li>• <i>Configuring T3 Start and End Flags</i></li> </ul> |

## static-interface

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>static-interface <i>interface-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b> <i>aci circuit-id-string</i> ari <i>remote-id-string</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | <p>Reserve the specified static PPPoE interface for use only by the PPPoE client with matching agent circuit identifier (ACI) and agent remote identifier (ARI) information. You can specify only one static interface per ACI/ARI pair configured for a named service entry, <b>empty</b> service entry, or <b>any</b> service entry in the PPPoE service name table.</p> <p>The static interface associated with an ACI/ARI pair takes precedence over the general pool of static interfaces associated with the PPPoE underlying interface.</p> <p>If you include the <b>static-interface</b> statement in the configuration, you cannot also include either the <b>dynamic-profile</b> statement or the <b>routing-instance</b> statement. The <b>dynamic-profile</b>, <b>routing-instance</b>, and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| <b>Options</b>                  | <b><i>interface-name</i></b> —Name of the static PPPoE interface reserved for use by the PPPoE client with matching ACI/ARI information. Specify the interface in the format <b>pp0.logical</b> , where <b>logical</b> is a logical unit number from 0 through 16385 for static interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li><li>• <i>Reserving a Static PPPoE Interface for Exclusive Use by a PPPoE Client</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



## supplicant

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>supplicant <i>single</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Specify the supplicant mode. Only single mode is supported.</p> <p>This option will authenticate only the first client that connects to a port. All other clients that connect later (802.1x compliant or non-compliant) will be allowed free access on that port without any further authentication. If the first authenticated client logs out, all other users are locked out until a client authenticates again.</p> |
| <b>Options</b>                  | <code>single</code> —Sets single mode.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">authenticator on page 420</a></li> <li>• <a href="#">dot1x on page 498</a></li> <li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li> </ul>                                                                                                                                          |

## supplicant-timeout

---

|                                 |                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | supplicant-timeout <i>seconds</i> ;                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Specify the number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.                                                                                                                |
| <b>Options</b>                  | <b>seconds</b> —Specify the number of seconds the port waits for the supplicant timeout.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 30 seconds                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 420</a></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li></ul> |

## swap

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | swap;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ]                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2X51-D20 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Specify the VLAN rewrite operation to replace a VLAN tag. The outer VLAN tag of the frame is overwritten with the user-specified VLAN tag information.<br><br>On MX Series routers, you can enter this statement on Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, aggregated Ethernet using Gigabit Ethernet IQ interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP. On EX Series switches, you can enter this statement on Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting the VLAN Tag on Tagged Frames</i></li> <li>• <i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |

## swap-push

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | swap-push;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ]    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | <p>Specify the VLAN rewrite operation to replace the outer VLAN tag of the frame with a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame.</p> <p>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Rewriting a VLAN Tag and Adding a New Tag</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                            |

## swap-swap

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | swap-swap;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Specify the VLAN rewrite operation to replace both the inner and the outer VLAN tags of the frame with a user-specified VLAN tag value.<br><br>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and for 100-Gigabit Ethernet Type 5 PIC with CFP.                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting the Inner and Outer VLAN Tags</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## switch-options

|                                 |                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | switch-options {<br>switch-port <i>port-number</i> {<br>( <a href="#">auto-negotiation</a>   no-auto-negotiation);<br><a href="#">speed</a> (10m   100m   1g);<br><a href="#">link-mode</a> (full-duplex   half-duplex);<br>}<br>} |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-pim</i> /0/0]                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                      |
| <b>Description</b>              | Configuration of the physical port characteristics is done under the single physical interface.                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                            |

## switch-port

---

|                                 |                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>switch-port <i>port-number</i> {<br/>    (auto-negotiation   no-auto-negotiation);<br/>    speed (10m   100m   1g);<br/>    link-mode (full-duplex   half-duplex);<br/>}</pre>                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-pim/0/0</i> <b>switch-options</b> ]                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                          |
| <b>Description</b>              | Configuration of the physical port characteristics, done under the single physical interface.                                                                                                                                                                          |
| <b>Default</b>                  | Autonegotiation is enabled by default. If the link speed and duplex are also configured, the interfaces use the values configured as the desired values in the negotiation.                                                                                            |
| <b>Options</b>                  | <p><b><i>port-number</i></b>—Ports are numbered 0 through 5 on the 6-port Gigabit Ethernet uPIM, 0 through 7 on the 8-port Gigabit Ethernet uPIM, and 0 through 15 on the 16-port Gigabit Ethernet uPIM.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                |

## switching-mode

---

|                                 |                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>switching-mode (bidirectional   unidirectional);</pre>                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <b>aps</b> ]                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                   |
| <b>Description</b>              | For unchannelized OC3, OC12, and OC48 SONET/SDH interfaces on T Series routers only, configure the interface to interoperate with SONET/SDH line-terminating equipment (LTE) that is provisioned for unidirectional linear APS in 1+1 architecture. |
| <b>Default</b>                  | If the <b>switching-mode</b> statement is not configured, the mode is bidirectional, and the interface does not interoperate with a unidirectional SONET/SDH LTE.                                                                                   |
| <b>Options</b>                  | <p><b>bidirectional</b>—Support bidirectional mode only.</p> <p><b>unidirectional</b>—Interoperate with a SONET/SDH LTE provisioned for unidirectional mode.</p>                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring Switching Mode</li></ul>                                                                                                                                                                          |

## symbol-period

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>symbol-period count;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> , <a href="#">link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Configure the threshold for sending symbol period events or taking the action specified in the action profile.</p> <p>A symbol error is any symbol code error on the underlying physical layer. The symbol period threshold is reached when the number of symbol errors reaches the configured value within the period window. The default period window is the number of symbols that can be transmitted on the underlying physical layer in 1 second. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for symbol period events.</p> <p><b>Range:</b> 0 through 100</p>                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li><i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>                                                                                                                                                                                                                                                                                |

## syslog (Interfaces)

---

|                          |                                                                                                                                                                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>syslog {<br/>  host hostname {<br/>    facility-override facility-name;<br/>    log-prefix prefix-number;<br/>    services priority-level;<br/>  }<br/>}</pre>                                                                                                        |
| Hierarchy Level          | [edit <a href="#">interfaces interface-name services-options</a> ]                                                                                                                                                                                                         |
| Release Information      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                          |
| Description              | For adaptive services interfaces, configure generation of system log messages for the service set. System log information is passed to the kernel for logging in the <b>/var/log</b> directory. Any values configured in the service set definition override these values. |
| Options                  | The remaining statements are explained separately.                                                                                                                                                                                                                         |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                    |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                                                                          |

## syslog (Monitoring)

---

|                          |                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | (syslog   no-syslog);                                                                                                                                                                                                                                                                                                   |
| Hierarchy Level          | [edit <a href="#">interfaces mo-fpc/pic/port multiservice-options</a> ]                                                                                                                                                                                                                                                 |
| Release Information      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                       |
| Description              | System logging is enabled by default. The system log information of the Monitoring Services PIC is passed to the kernel for logging in the <b>/var/log</b> directory. <ul style="list-style-type: none"><li>• <b>syslog</b>—Enable PIC system logging.</li><li>• <b>no-syslog</b>—Disable PIC system logging.</li></ul> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                 |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 149</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                                                                                          |



## syslog (OAM Action)

|                                 |                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>syslog;</code>                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile action</a> ]                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                |
| <b>Description</b>              | Generate a syslog message for the Ethernet Operation, Administration, and Management (OAM) event.                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li> </ul> |

## system-priority

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>system-priority <i>priority</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces aeX aggregated-ether-options lacp]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Define LACP system priority at the aggregated Ethernet interface level. This system priority value takes precedence over a system priority value configured at the global <b>[edit chassis]</b> hierarchy level.</p> <p>The device with the lower system priority value determines which links between LACP partner devices are active and which are in standby for each LACP group. The device on the controlling end of the link uses port priorities to determine which ports are bundled into the aggregated bundle and which ports are put in standby mode. Port priorities on the other device (the noncontrolling end of the link) are ignored. In priority comparisons, numerically lower values have higher priority. Therefore, the system with the numerically lower value (higher priority value) for LACP system priority becomes the controlling system. If both devices have the same LACP system priority (for example, they are both configured with the default setting of 127), the device MAC address determines which switch is in control.</p> |
| <b>Options</b>                  | <p><b><i>priority</i></b>—Priority for the aggregated Ethernet system. A smaller value indicates a higher priority.</p> <p><b>Range:</b> 0 through 65535</p> <p><b>Default:</b> 127</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## t1-options

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>t1-options {<br/>    bert-algorithm <i>algorithm</i>;<br/>    bert-error-rate <i>rate</i>;<br/>    bert-period <i>seconds</i>;<br/>    buildout <i>value</i>;<br/>    byte-encoding (nx56   nx64);<br/>    crc-major-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5);<br/>    crc-minor-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5   5e-6   1e-6);<br/>    fcs (16   32);<br/>    framing (esf   sf);<br/>    idle-cycle-flag (flags   ones);<br/>    invert-data;<br/>    line-encoding (ami   b8zs);<br/>    loopback (local   payload   remote);<br/>    remote-loopback-respond;<br/>    start-end-flag (filler   shared);<br/>    timeslots <i>time-slot-range</i>;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Configure T1-specific physical interface properties.<br><br>The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>T1 Interfaces Overview</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## t310

---

|                                 |                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | t310-value <i>seconds</i> ;                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim/O/port</i> isdn-options]                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                               |
| <b>Description</b>              | For ISDN interfaces, configure the Q.931-specific timer for T310, in seconds. The Q.931 protocol is involved in the setup and termination of connections.                       |
| <b>Options</b>                  | <p><b>seconds</b>—Timer value, in seconds.</p> <p><b>Range:</b> 1 through 65,536 seconds</p> <p><b>Default:</b> 10 seconds</p>                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Physical Interface Properties</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul> |

## t391

---

|                                 |                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | t391 <i>seconds</i> ;                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                   |
| <b>Description</b>              | For link services and voices interfaces only, set Frame Relay link integrity polling interval.                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>seconds</b>—Link integrity polling interval.</p> <p><b>Range:</b> 5 through 30 seconds</p> <p><b>Default:</b> 10 seconds</p>                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">n391 on page 696</a></li> <li>• <a href="#">n392 on page 697</a></li> <li>• <a href="#">n393 on page 698</a></li> <li>• <a href="#">t392 on page 874</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## t392

---

|                                 |                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | t392 <i>seconds</i> ;                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For link services and voices interfaces only, set Frame Relay polling verification interval.                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b><i>seconds</i></b> —Polling verification interval.<br><b>Range:</b> 5 through 30 seconds<br><b>Default:</b> 15 seconds                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">n391 on page 696</a></li><li>• <a href="#">n392 on page 697</a></li><li>• <a href="#">n393 on page 698</a></li><li>• <a href="#">t391 on page 873</a></li><li>• <a href="#">timeslots on page 882</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul> |

## t3-options

**Syntax**    t3-options {  
               atm-encapsulation (direct | plcp);  
               bert-algorithm *algorithm*;  
               bert-error-rate *rate*;  
               bert-period *seconds*;  
               (cbit-parity | no-cbit-parity);  
               compatibility-mode (digital-link | kentrox | larscom) <subrate *value*>;  
               fcs (16 | 32);  
               (feac-loop-respond | no-feac-loop-respond);  
               idle-cycle-flag *value*;  
               (long-buildout | no-long-buildout);  
               (loop-timing | no-loop-timing);  
               loopback (local | payload | remote);  
               start-end-flag *value*;  
               }

**Hierarchy Level**    [edit interfaces *interface-name*]

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure T3-specific physical interface properties, including the properties of DS3 channels on a channelized OC12 interface. The **long-buildout** statement is not supported for DS3 channels on a channelized OC12 interface.

On T3 interfaces, the default encapsulation is PPP.

For ATM1 interfaces, you can configure a subset of E3 options statements.

The statements are explained separately.

**Required Privilege Level**    interface—To view this statement in the configuration.  
                                   interface-control—To add this statement to the configuration.

**Related Documentation**    • *T3 Interfaces Overview*

## tag-protocol-id (TPIDs Expected to Be Sent or Received)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>tag-protocol-id [tpids];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <code>gigether-options ethernet-switch-profile</code> ],<br>[edit interfaces <i>interface-name</i> <code>aggregated-ether-options ethernet-switch-profile</code> ],<br>[edit interfaces <i>interface-name</i> <code>aggregated-ether-options ethernet-switch-profile</code> ],<br>[edit interfaces <i>interface-name</i> <code>ether-options ethernet-switch-profile</code> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 13.2X50-D15 for EX Series switches.<br>Statement introduced in Junos OS Release 14.1X53-D15 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, aggregated Ethernet with Gigabit Ethernet IQ interfaces, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC, and the built-in Gigabit Ethernet port on the M7i router), define the TPIDs expected to be sent or received on a particular VLAN. For each Gigabit Ethernet port, you can configure up to eight TPIDs using the <b>tag-protocol-id</b> statement; but only the first four TPIDs are supported on IQ2 and IQ2-E interfaces.</p> <p>For 10-Gigabit Ethernet LAN/WAN PIC interfaces on T Series routers only the default TPID value (<b>0x8100</b>) is supported.</p> <p>For Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces on EX Series switches, define the TPIDs expected to be sent or received on a particular VLAN. The default TPID value is <b>0x8100</b>. Other supported values are <b>0x88a8</b>, <b>0x9100</b>, and <b>0x9200</b>.</p> |
| <b>Options</b>                  | <i>tpids</i> —TPIDs to be accepted on the VLAN. Specify TPIDs in hexadecimal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring Frames with Particular TPIDs to Be Processed as Tagged Frames</i></li><li><i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## tag-protocol-id (TPID to Rewrite)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>tag-protocol-id <i>tpid</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces only, configure the outer TPID value. All TPIDs you include in input and output VLAN maps must be among those you specify at the [edit interfaces <i>interface-name</i> <a href="#">gigether-options ethernet-switch-profile tag-protocol-id [ <i>tpids</i> ]</a>] hierarchy level.</p> <p>For 10-Gigabit Ethernet LAN/WAN PIC interfaces on T Series routers the default TPID value (<b>0x8100</b>) is supported.</p>                                                 |
| <b>Default</b>                  | If the <code>tag-protocol-id</code> statement is not configured, the TPID value is 0x8100.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Inner and Outer TPIDs and VLAN IDs</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## targeted-broadcast

---

|                                 |                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | targeted-broadcast {<br>forward-and-send-to-re;<br>forward-only;<br>}                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet]                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Specify the IP packets destined for a Layer 3 broadcast address to be forwarded to both an egress interface and the Routing Engine, or to an egress interface only. The packets are broadcast only if the egress interface is a LAN interface.</p> <p>The statements are explained separately.</p> |
| <b>Default</b>                  | When this statement is not included, broadcast packets are sent to the Routing Engine only.                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Targeted Broadcast on page 244</a></li><li>• <a href="#">Understanding Targeted Broadcast on page 243</a></li></ul>                                                                                                                   |



## targeted-distribution (Static Interfaces over Aggregated Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | targeted-distribution;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <b>demux0</b> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces <b>pp0</b> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.<br>Statement introduced in Junos OS Release 13.2R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Configure egress data for a logical interface to be sent across a single member link in an aggregated Ethernet bundle. A backup link is provisioned with CoS scheduling resources in the event that the primary assigned link goes down. The aggregated Ethernet interface must be configured without link protection.                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>CoS for PPPoE Subscriber Interfaces Overview</i></li> <li>• <i>Configuring the Distribution Type for PPPoE Subscribers on Aggregated Ethernet Interfaces</i></li> <li>• <i>Verifying the Distribution of PPPoE Subscribers in an Aggregated Ethernet Interface</i></li> <li>• <i>Targeted Traffic Distribution on Aggregated Ethernet Interfaces in a Virtual Chassis</i></li> <li>• <i>Configuring Module Redundancy for a Virtual Chassis</i></li> <li>• <i>Configuring Chassis Redundancy for a Virtual Chassis</i></li> </ul> |

## tei-option

|                                 |                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | tei-option (first-call   power-up);                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <b>br-pim/0/port</b> isdn-options]                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                        |
| <b>Description</b>              | For ISDN interfaces, configure when the Terminal Endpoint Identifier (TEI) negotiates with the ISDN provider.                                                                            |
| <b>Options</b>                  | <b>first-call</b> —Activation does not occur until the call setup is sent.<br><br><b>power-up</b> —Activation occurs when the Services Router is powered on.<br><b>Default:</b> power-up |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Physical Interface Properties</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>          |

## terminate (PPPoE Service Name Tables)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | terminate;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> <a href="#">service</a> <i>service-name</i> ],<br>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a><br>aci <i>circuit-id-string</i> ari <i>remote-id-string</i> ]                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Support at [edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a> aci <i>circuit-id-string</i> ari <i>remote-id-string</i> ] hierarchy level introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Direct the router to immediately respond to a PPPoE Active Discovery Initiation (PADI) control packet received from a PPPoE client by sending the client a PPPoE Active Discovery Offer (PADO) packet. The PADO packet contains the name of the access concentrator (router) that can service the client request. The <b>terminate</b> action is the default action for a named service entry, <b>empty</b> service entry, <b>any</b> service entry, or agent circuit identifier/agent remote identifier (ACI/ARI) pair in a PPPoE service name table. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## then

---

|                                 |                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | then {<br>discard;<br>}                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit firewall hierarchical-policer aggregate],<br>[edit firewall hierarchical-policer premium]                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                                                          |
| <b>Description</b>              | On M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, discard packets when a specified bandwidth or burst limits for an aggregate level of a hierarchical policer is reached. |
| <b>Options</b>                  | <b>discard</b> —Discard packets if condition is met.                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Applying Policers on page 203</a></li><li>• <i>Class of Service Feature Guide for Routing Devices</i></li></ul>                                                                                                    |

---

## threshold

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>threshold <i>bytes</i>;</code>                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Specify the bucket threshold, which controls the burstiness of the leaky bucket mechanism. The larger the value, the more bursty the traffic, which means that over a very short amount of time, the interface can receive or transmit close to line rate, but the average over a longer time is at the configured bucket rate.</p>                                 |
| <b>Options</b>                  | <p><b><i>bytes</i></b>—Maximum size, in bytes, for traffic bursts. For ease of entry, you can enter <b><i>number</i></b> either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000). For example, the entry <b>threshold 2k</b> corresponds to a threshold of 2000 bytes.</p> <p><b>Range:</b> 0 through 65,535 bytes</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li></ul>                                                                                                                                                                                                    |

## timeslots

|                            |                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>timeslots <i>time-slot-range</i>;</code>                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>     | [edit interfaces <i>e1-fpc/pic/port</i> ],<br>[edit interfaces <i>t1-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> <b>e1-options</b> ],<br>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> ],<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                           |
| <b>Description</b>         | For E1 and T1 interfaces, allocate the specific time slots by number.                                                                                                                                                                                                                                       |



**NOTE:** When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the `timeslots` statement must be included at the [edit interfaces *e1-fpc/pic/port*] or [edit interfaces *t1-fpc/pic/port*] hierarchy level as appropriate.

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b> | <p><b><i>time-slot-range</i></b>—Actual time slot numbers allocated:</p> <p><b>Range:</b> Ranges vary by interface type and configuration option as follows:</p> <ul style="list-style-type: none"> <li>• 1 through 24 for T1 interfaces (0 is reserved)</li> <li>• 1 through 31 for 4-port E1 PICs (0 is reserved)</li> <li>• 1 through 31 for NxDS0 interfaces (0 is reserved)</li> <li>• 2 through 32 for 10-port Channelized E1 and 10-port Channelized E1 IQ PICs (1 is reserved)</li> <li>• 2 through 32 for the setting under <b>e1-options</b> with IQE PICs (1 is reserved) (when creating fractional E1)</li> <li>• 1 through 31 for the setting under <b>partition</b> with IQE PICs (0 is reserved) (when creating NxDS0)</li> </ul> |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**NOTE:** When creating fractional E1 interfaces only, if you connect a 4-port E1 PIC interface to a device that uses time slot numbering from 2 through 32, you must subtract 1 from the configured number of time slots.

|                                 |                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Fractional E1 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Fractional T1 IQ and IQE Interfaces</i></li> </ul> |

- *Configuring Fractional E1 Time Slots*
- *Configuring Fractional T1 Time Slots*
- *Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots*

## tm

---

|                                 |                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | tm (ignore   normal   require);                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dce-options],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> dte-options]                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                     |
| <b>Description</b>              | For EIA-530 interfaces only, configure the from-DCE signal, test-mode (TM).                                                                                                                                                           |
| <b>Options</b>                  | <p><b>ignore</b>—The from-DCE signal is ignored.</p> <p><b>normal</b>—Normal TM signal handling as defined by the TIA/EIA Standard 530.</p> <p><b>require</b>—The from-DCE signal must be asserted.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 302</a></li> </ul>                                                                                                                |

## tm-polarity

---

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | tm-polarity (negative   positive);                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | Configure TM signal polarity.                                                                                                      |
| <b>Options</b>                  | <p><b>negative</b>—Negative signal polarity.</p> <p><b>positive</b>—Positive signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 305</a></li> </ul>               |

## traceoptions (Individual Interfaces)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {<br/>    file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;<br/>    flag <i>flag</i>;<br/>    match;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>         | <p>Define tracing operations for individual interfaces.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>The interfaces <b>traceoptions</b> statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system <b>syslog</b> file in the directory <b>/var/log/dcd</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>             | <p><b>file name</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log/dcd</b>. By default, interface process tracing output is placed in the file <b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p><b>match</b>—(Optional) Regular expression for lines to be traced.</p> <p><b>no-world-readable</b>—(Optional) Prevent any user from reading the log file.</p> <p><b>world-readable</b>—(Optional) Allow any user to read the log file.</p> <p><b>size size</b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options.</p> <ul style="list-style-type: none"><li>• <b>all</b>—All interface tracing operations</li><li>• <b>event</b>—Interface events</li><li>• <b>ipc</b>—Interface interprocess communication (IPC) messages</li></ul> |

- **media**—Interface media changes
- **q921**—Trace ISDN Q.921 frames
- **q931**—Trace ISDN Q.931 frames

**Required Privilege** interface—To view this statement in the configuration.  
**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- [Tracing Operations of an Individual Router Interface on page 311](#)

## traceoptions (Interface Process)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {<br/>    file &lt;filename&gt; &lt;files number&gt; &lt;match regular-expression&gt; &lt;size size&gt; &lt;world-readable  <br/>        no-world-readable&gt;;<br/>    flag flag &lt;disable&gt;;<br/>    no-remote-trace;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>     | [edit interfaces]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>         | Define tracing operations for the interface process (dcd).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>dcd</b>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"><li>• <b>all</b></li><li>• <b>change-events</b>—Log changes that produce configuration events</li><li>• <b>config-states</b>—Log the configuration state machine changes</li><li>• <b>kernel</b>—Log configuration IPC messages to kernel</li><li>• <b>kernel-detail</b>—Log details of configuration messages to kernel</li></ul> <p><b>no-world-readable</b>—(Optional) Disallow any user to read the log file.</p> |



**size** *size*—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**Syntax:** **xk** to specify kilobytes, **xm** to specify megabytes, or **xg** to specify gigabytes

**Range:** 10 KB through the maximum file size supported on your router

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

**match** *regex*—(Optional) Refine the output to include only those lines that match the given regular expression.

|                                 |                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.                                                                      |
|                                 | interface-control—To add this statement to the configuration.                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Tracing Operations of the Interface Process on page 312</a></li> </ul> |

## traceoptions (LACP)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {<br/>    file &lt;filename&gt; &lt;files number&gt; &lt;size size&gt; &lt;world-readable   no-world-readable&gt;;<br/>    flag flag;<br/>    no-remote-trace;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>     | [edit protocols lacp]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>         | Define tracing operations for the LACP protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>             | If you do not include this statement, no LACP protocol tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>             | <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>lacpd</b>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"><li>• <b>all</b>—All LACP tracing operations</li><li>• <b>configuration</b>—Configuration code</li><li>• <b>packet</b>—Packets sent and received</li><li>• <b>process</b>—LACP process events</li><li>• <b>protocol</b>—LACP protocol state machine</li><li>• <b>routing-socket</b>—Routing socket events</li><li>• <b>startup</b>—Process startup events</li></ul> <p><b>no-world-readable</b>—(Optional) Prevent any user from reading the log file.</p> <p><b>size size</b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues</p> |

until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option:

**Syntax:** *xk* to specify kilobytes, *xm* to specify megabytes, or *xg* to specify gigabytes

**Range:** 10 KB through the maximum file size supported on your router

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

|                                 |                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.                           |
|                                 | interface-control—To add this statement to the configuration.                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Tracing LACP Operations</i></li></ul> |

## traceoptions (PPP Process)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {<br/>    file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regular-expression</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable  <br/>        no-world-readable&gt;;<br/>    flag <i>flag</i>;<br/>    level <i>severity-level</i>;<br/>    no-remote-trace;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit protocols ppp]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>         | <p>Define tracing operations for the PPP process.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>You cannot specify a separate trace tile. Tracing information is placed in the system <b>syslog</b> file in the directory <b>/var/log/pppd</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>             | If you do not include this statement, no PPPD-specific tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>             | <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, commit script process tracing output is placed in the file <b>ppd</b>. If you include the <b>file</b> statement, you must specify a filename. To retain the default, you can specify <b>eventd</b> as the filename.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the PPPD-specific tracing options.</p> <ul style="list-style-type: none"><li>• <b>access</b>—Access code</li><li>• <b>address-pool</b>—Address pool code</li><li>• <b>all</b>—All areas of code</li></ul> |

- **auth**—Authentication code
- **chap**—Challenge Handshake Authentication Protocol (CHAP) code
- **config**—Configuration code
- **ifdb**—Interface database code
- **lcp**—LCP state machine code
- **memory**—Memory management code
- **message**—Message processing code
- **mlppp**—Trace MLPPP code
- **ncp**—NCP state machine code
- **pap**—Password Authentication Protocol (PAP) code
- **ppp**—PPP protocol processing code
- **radius**—RADIUS processing code
- **rtsock**—Routing socket code
- **session**—Session management code
- **signal**—Signal handling code
- **timer**—Timer code
- **ui**—User interface code

**match *regex***—(Optional) Refine the output to include only those lines that match the given regular expression.

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named ***trace-file*** reaches this size, it is renamed ***trace-file.0***. When the ***trace-file*** again reaches its maximum size, ***trace-file.0*** is renamed ***trace-file.1*** and ***trace-file*** is renamed ***trace-file.0***. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through 1 GB

**Default:** 128 KB


**world-readable**—(Optional) Enable unrestricted file access.

**non-world-readable**—(Optional) By default, log files can be accessed only by the user who configures the tracing operation. Specify **non-world-readable** to reset the default.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|

- Related Documentation**
- [Tracing Operations of the pppd Process on page 133](#)

## traceoptions (PPPoE)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> traceoptions {     file &lt;filename&gt; &lt;files number&gt; &lt;match regular-expression&gt; &lt;size maximum-file-size&gt;       &lt;world-readable   no-world-readable&gt;;     filter {       aci regular-expression;       ari regular-expression;       service-name regular-expresion;       underlying-interface interface-name;     }     flag flag;     level (all   error   info   notice   verbose   warning);     no-remote-trace; } </pre>                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit protocols pppoe]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.6.<br>Option <b>filter</b> introduced in Junos OS Release 12.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>         | Define tracing operations for PPPoE processes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>             | <p><b>file filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>disable</b>—Disable this trace flag.</p> <p><b>filter</b>—Additional filter to refine the output to display particular subscribers. Filtering based on the following subscriber identifiers simplifies troubleshooting in a scaled environment.</p> |
|                            | <p> <b>BEST PRACTICE:</b> Due to the complexity of agent circuit identifiers and agent remote identifiers, we recommend that you do not try an exact match when filtering on these options. For service names, searching on the exact name is appropriate, but you can also use a regular expression with that option.</p>                                                                                                                                                                                                                                                                                                                                                     |
|                            | <ul style="list-style-type: none"> <li>• <b>aci regular-expression</b>—Regular expression to match the agent circuit identifier provided by PPPoE client.</li> <li>• <b>ari regular-expression</b>—Regular expression to match the agent remote identifier provided by PPPoE client.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

- **service *regular-expression***—Regular expression to match the name of PPPoE service.
- **underlying-interface *interface-name***—Name of a PPPoE underlying interface. You cannot use a regular expression for this filter option.

**flag *flag***—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all**—Trace all operations.
- **config**—Trace configuration events.
- **events**—Trace events.
- **gres**—Trace GRES events.
- **init**—Trace initialization events.
- **interface-db**—Trace interface database operations.
- **memory**—Trace memory processing events.
- **protocol**—Trace protocol events.
- **rtsock**—Trace routing socket events.
- **session-db**—Trace connection events and flow.
- **signal**—Trace signal operations.
- **state**—Trace state handling events.
- **timer**—Trace timer processing.
- **ui**—Trace user interface processing.

**level**—Level of tracing to perform. You can specify any of the following levels:

- **all**—Match all levels.
- **error**—Match error conditions.
- **info**—Match informational messages.
- **notice**—Match notice messages about conditions requiring special handling.
- **verbose**—Match verbose messages.
- **warning**—Match warning messages.

**Default:** error

**match *regular-expression***—(Optional) Refine the output to include lines that contain the regular expression.

**no-remote-trace**—Disable remote tracing.

**no-world-readable**—(Optional) Disable unrestricted file access.



**size *maximum-file-size***—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**Syntax:** **size***k* to specify KB, **size***m* to specify MB, or **size***g* to specify GB

**Range:** 10240 through 1073741824

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

**Required Privilege Level** trace—To view this statement in the configuration.  
trace-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring PPPoE Service Name Tables*
- *Tracing PPPoE Operations*

## translate-discard-eligible

**Syntax** (translate-discard-eligible | no-translate-discard-eligible);

**Hierarchy Level** [edit interfaces *interface-name* **unit** *logical-unit-number* **family** *ccc*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* **unit** *logical-unit-number* **family** *ccc*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay discard eligible (DE) control bits.

**Default** DE bit translation is disabled.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Frame Relay Control Bit Translation*

## translate-fecn-and-becn

---

|                                 |                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (translate-fecn-and-becn   no-translate-fecn-and-becn);                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                |
| <b>Description</b>              | For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay forward explicit congestion notification (FECN) control bits and Frame Relay backward explicit congestion notification (BECN) control bits.                 |
| <b>Default</b>                  | FECN and BECN bit translation is disabled.                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Frame Relay Control Bit Translation</i></li></ul>                                                                                                                                                         |

## translate-plp-control-word-de

---

|                                 |                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | translate-plp-control-word-de                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ]                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 11.1.                                                                                                                      |
| <b>Description</b>              | For the interfaces with encapsulation type Frame Relay CCC, classify and rewrite the control word discard eligibility (DE) bit based on the packet loss priority (PLP). |
| <b>Default</b>                  | PLP bit translation is disabled.                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Frame Relay Control Bit Translation</i></li><li>• <i>frame-relay-de</i></li></ul>                                |

## transmit-bucket

---

|                                 |                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | transmit-bucket {<br><code>overflow</code> discard;<br><code>rate percentage</code> ;<br><code>threshold bytes</code> ;<br>}                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Set parameters for the transmit leaky bucket, which specifies what percentage of the interface's total capacity can be used to transmit packets.</p> <p>For each DS3 channel in a channelized OC12 interface, you can configure a unique transmit bucket.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties to Reduce Network Congestion on page 135</a></li> <li>• <a href="#">receive-bucket on page 807</a></li> </ul>                                                                                      |

## transmit-clock

---

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | transmit-clock invert;                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <code>serial-options</code> ]                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                  |
| <b>Description</b>              | Configure the transmit clock signal.                                                                                               |
| <b>Options</b>                  | <code>invert</code> —Shift the clock phase 180 degrees.                                                                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Clocking Mode on page 300</a></li> </ul>               |

## transmit-period

---

|                                 |                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | transmit-period <i>seconds</i> ;                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]                                                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Set the number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>seconds</b>—The number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> 30 seconds</p>                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 420</a></li><li>• <a href="#">dot1x on page 498</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 604</a></li></ul> |

## transmit-weight (ATM2 IQ CoS Forwarding Class)


|                                 |                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | transmit-weight (cells <i>number</i>   percent <i>number</i> );                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                 |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign a transmission weight to a forwarding class.                                                                                                                                                                                                                  |
| <b>Default</b>                  | 95 percent for queue 0, 5 percent for queue 3.                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>percent <i>percent</i></b>—Transmission weight of the forwarding class as a percentage of the total bandwidth.<br/> <b>Range:</b> 5 through 100</p> <p><b>cells <i>number</i></b>—Transmission weight of the forwarding class as a number of cells.<br/> <b>Range:</b> 0 through 32,000</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li> </ul>                                                                                                                                                                                              |

## transmit-weight (ATM2 IQ Virtual Circuit)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>transmit-weight <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | <p>For ATM2 IQ PICs only, configure the transmission weight.</p> <p>Each VC is serviced in weighted round robin (WRR) mode. When VCs have data to send, they send the number of cells equal to their weight before passing control to the next active VC. This allows proportional bandwidth sharing between multiple VCs within a rate-shaped VP tunnel. VP tunnels are not supported on multipoint interfaces.</p> |
| <b>Options</b>                  | <p><b><i>number</i></b>—Number of cells a VC sends before passing control to the next active VC within a VP tunnel.</p> <p><b>Range:</b> 1 through 32,767</p>                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the ATM2 IQ Transmission Weight</i></li></ul>                                                                                                                                                                                                                                                                                                                 |

## traps

|                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                 | (traps   no-traps);                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                        | [edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                            |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                    | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Support at the [edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> ] hierarchy level introduced in Junos OS Release 15.1R3 on MX Series routers for enhanced subscriber management.                                                          |
| <b>Description</b>                                                                                                                                                                                                                                                                                            | <p>Enable or disable the sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.</p> <p>(Enhanced subscriber management for MX Series routers) To enable SNMP notifications, you must first configure the <b>interface-mib</b> statement at the [edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i>] hierarchy level. If <b>interface-mib</b> is not configured, the <b>traps</b> statement has no effect.</p> |
| <div>  <p><b>BEST PRACTICE:</b> To achieve maximum performance when enhanced subscriber management is enabled, we recommend that you <i>not</i> enable SNMP notifications on all dynamic subscriber interfaces.</p> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                               | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• <a href="#">Enabling or Disabling SNMP Notifications on Physical Interfaces on page 150</a></li> <li>• <a href="#">Enabling or Disabling SNMP Notifications on Logical Interfaces on page 180</a></li> </ul>                                                                                                                                                                                                                                       |

## trigger

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>trigger {<br/>    defect ignore;<br/>    defect <b>hold-time</b> up milliseconds down milliseconds;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>sonet-options</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For ATM over SONET/SDH, SONET/SDH interfaces, and 10-Gigabit Ethernet interfaces in WAN PHY mode, configure SONET/SDH defect triggers to be ignored.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>                  | If you do not include this statement, all SONET/SDH defect triggers are honored.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>defect</b>—Defect to ignore or hold. It can be one of the following:</p> <ul style="list-style-type: none"><li>• <b>ais-l</b>—Line alarm indication signal</li><li>• <b>ais-p</b>—Path alarm indication signal</li><li>• <b>ber-sd</b>—Bit error rate signal degrade</li><li>• <b>ber-sf</b>—Bit error rate signal fault</li><li>• <b>locd</b> (ATM only)—Loss of cell delineation</li><li>• <b>lof</b>—Loss of frame</li><li>• <b>lol</b>—PHY loss of light</li><li>• <b>lop-p</b>—Path loss of pointer</li><li>• <b>los</b>—Loss of signal</li><li>• <b>pll</b>—PHY phase-locked loop out of lock</li><li>• <b>plm-p</b>—Path payload (signal) label mismatch</li><li>• <b>rfl-l</b>—Line remote failure indication</li><li>• <b>rfl-p</b>—Path remote failure indication</li><li>• <b>uneq-p</b>—Path unequipped</li></ul> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Defect Triggers</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## trigger-link-failure

|                                 |                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | [trigger-link-failure <i>interface-name</i> ];                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>lsq-fpc/pic/port</i> lsq-failure-options]                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.                                                                                         |
| <b>Description</b>              | List of SONET interfaces connected to the LSQ interface that can implement Automatic Protection Switching (APS) if the LSQ PIC fails. |
| <b>Options</b>                  | <i>interface-name</i> —Name of SONET interface.                                                                                       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## trunk-bandwidth

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | trunk-bandwidth <i>rate</i> ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>For ATM2 IQ interfaces configured to use Layer 2 circuit trunk mode, configure a scheduler so that unused bandwidth from any inactive trunk is proportionally shared among the active trunks.</p> <p>During congestion, each trunk receives a proportional share of the leftover bandwidth, thus minimizing the latency on each trunk.</p>                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><i>rate</i>—Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p> <p><b>Range:</b> 1,000,000 through 542,526,792 bps</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Layer 2 Circuit Trunk Mode Scheduling Overview</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## trunk-id

---

|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>trunk-id number;</code>                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>For ATM2 IQ interfaces with ATM CCC cell-relay encapsulation, configure the trunk identification number.</p> <p>When you associate a trunk ID number with a logical interface, you are in effect specifying the interfaces that are allowed to send ATM traffic over an LSP.</p> |
| <b>Options</b>                  | <p><b>number</b>—A valid trunk identifier.</p> <p><b>Range:</b> For UNI mode, 0 through 7. For NNI mode, 0 through 31.</p>                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Layer 2 Circuit Transport Mode</i></li></ul>                                                                                                                                                                                 |

## ttl


---

|                                 |                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ttl value;</code>                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> <b>tunnel</b> ]                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4                                                                                   |
| <b>Description</b>              | Set the time-to-live value bit in the header of the outer IP packet.                                                               |
| <b>Options</b>                  | <p><b>value</b>—Time-to-live value.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 64</p>                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                  |

## tunnel

|                                 |                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> tunnel {   backup-destination address;   destination address;   key number;   routing-instance {     destination routing-instance-name;   }   source source-address;   ttl number; } </pre>                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                          |
| <b>Description</b>              | <p>Configure a tunnel. You can use the tunnel for unicast and multicast traffic or just for multicast traffic. You can also use tunnels for encrypted traffic or VPNs.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS VPNs Library for Routing Devices</i></li> </ul>                                            |

## underlying-interface

|                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                          | <code>underlying-interface <i>interface-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                 | <p>[edit interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>]</p> |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                             | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Support for aggregated Ethernet added in Junos OS Release 9.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                     | <p>Configure the interface on which PPP over Ethernet is running.</p> <p>For demux interfaces, configure the underlying interface on which the demultiplexing (demux) interface is running.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                         | <p><b><i>interface-name</i></b>—Name of the interface on which PPP over Ethernet or demux is running. For example, <b>at-0/0/1.0</b> (ATM VC), <b>fe-1/0/1.0</b> (Fast Ethernet interface), <b>ge-2/0/0.0</b> (Gigabit Ethernet interface), <b>ae1.0</b> (for IP demux on an aggregated Ethernet interface), or <b>ae1</b> (for VLAN demux on an aggregated Ethernet interface).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <div style="display: flex; align-items: center;">  <div> <p><b>NOTE:</b> Demux interfaces are currently supported on Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet interfaces, or aggregated Ethernet devices.</p> </div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                        | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demultiplexing Interface on page 276</a></li> <li>• <a href="#">Configuring a VLAN Demultiplexing Interface on page 280</a></li> <li>• <a href="#">Configuring the PPPoE Underlying Interface</a></li> <li>• <a href="#">Junos OS Interfaces and Routing Configuration Guide</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## unframed

---

|                                 |                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (unframed   no-unframed);                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ]                                                                                                           |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                             |
| <b>Description</b>              | For E3 IQ interfaces only, enable or disable unframed mode. In unframed mode, the E3 IQ interface do not detect yellow ( <b>ylw</b> ) or loss-of-frame ( <b>lof</b> ) alarms. |
| <b>Default</b>                  | Unframed mode is disabled.                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring E3 IQ and IQE Unframed Mode</a></li> </ul>                                                                   |

## unidirectional

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | unidirectional;                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Create two new, unidirectional (transmit-only and receive-only) physical interfaces subordinate to the original parent interface. Unidirectional links are currently supported only on 10-Gigabit Ethernet interfaces on the following hardware: <ul style="list-style-type: none"> <li>• 4-port 10-Gigabit Ethernet DPC on the MX960 router</li> <li>• 10-Gigabit Ethernet IQ2 PIC and 10-Gigabit Ethernet IQ2E PIC on the T Series router</li> </ul> |
| <b>Default</b>                  | Disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Unidirectional Traffic Flow on Physical Interfaces on page 137</a></li> <li>• <a href="#">Enabling Unidirectional Traffic Flow on Physical Interfaces on page 138</a></li> </ul>                                                                                                                                                                                                    |

## unit (Dynamic Profiles Standard Interface)

```

Syntax unit logical-unit-number {
 auto-configure {
 agent-circuit-identifier {
 dynamic-profile profile-name;
 }
 }
 dial-options {
 ipsec-interface-id name;
 l2tp-interface-id name;
 (shared | dedicated);
 }
 encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-cisco-nlpid | atm-tcc-vc-mux
 | atm-mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux | atm-snap | atm-tcc-snap
 | atm-vc-mux | ether-over-atm-llc | ether-vpls-over-atm-llc | ether-vpls-over-fr |
 ether-vpls-over-ppp | ethernet | frame-relay-ccc | frame-relay-ppp | frame-relay-tcc |
 frame-relay-ether-type | frame-relay-ether-type-tcc | multilink-frame-relay-end-to-end
 | multilink-ppp | ppp-over-ether | ppp-over-ether-over-atm-llc | vlan-bridge | vlan-ccc |
 vlan-vci-ccc | vlan-tcc | vlan-vpls);
 family family {
 access-concentrator name;
 address address;
 direct-connect;
 duplicate-protection;
 dynamic-profile profile-name;
 filter {
 adf {
 counter;
 input-precedence precedence;
 not-mandatory;
 output-precedence precedence;
 rule rule-value;
 }
 input filter-name {
 precedence precedence;
 }
 output filter-name {
 precedence precedence;
 }
 }
 max-sessions number;
 max-sessions-vsa-ignore;
 rpf-check {
 fail-filter filter-name;
 mode loose;
 }
 service {
 input {
 service-set service-set-name {
 service-filter filter-name;
 }
 }
 post-service-filter filter-name;
 }
 }
 }

```

```

input-vlan-map {
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 (push | swap);
 tag-protocol-id tpid;
 vlan-id number;
}
output {
 service-set service-set-name {
 service-filter filter-name;
 }
}
output-vlan-map {
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 (pop | swap);
 tag-protocol-id tpid;
 vlan-id number;
}
}
service-name-table table-name
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
maximum-seconds>;
unnumbered-address interface-name <preferred-source-address address>;
filter {
 input filter-name {
 shared-name filter-shared-name;
 }
 output filter-name {
 shared-name filter-shared-name;
 }
}
keepalives {
 interval seconds;
}
ppp-options {
 chap;
 pap;
}
vlan-id number;
vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
}
}

```

**Hierarchy Level** [edit [dynamic-profiles](#) *profile-name* [interfaces](#) *interface-name*]

**Release Information** Statement introduced in Junos OS Release 9.2.

**Description** Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

**Options** *logical-unit-number*—The specific unit number of the interface you want to assign to the dynamic profile, or one of the following Junos OS predefined variables:

- **\$junos-underlying-interface-unit**—For static VLANs, the unit number variable. The static unit number variable is dynamically replaced with the client unit number when the client session begins. The client unit number is specified by the DHCP when it accesses the subscriber network.
- **\$junos-interface-unit**—The unit number variable on a dynamic underlying VLAN interface for which you want to enable the creation of dynamic VLAN subscriber interfaces based on agent circuit identifier information.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Dynamic Underlying VLAN Interfaces to Use Agent Circuit Identifier Information*
- *Configuring Static Underlying VLAN Interfaces to Use Agent Circuit Identifier Information*
- *Agent Circuit Identifier-Based Dynamic VLANs Components Overview*



## unit

```

Syntax unit logical-unit-number {
 accept-source-mac {
 mac-address mac-address {
 policer {
 input cos-policer-name;
 output cos-policer-name;
 }
 }
 }
 accounting-profile name;
 advisory-options {
 downstream-rate rate;
 upstream-rate rate;
 }
 allow-any-vci;
 atm-scheduler-map (map-name | default);
 backup-options {
 interface interface-name;
 }
 bandwidth rate;
 cell-bundle-size cells;
 clear-dont-fragment-bit;
 compression {
 rtp {
 maximum-contexts number <force>;
 f-max-period number;
 queues [queue-numbers];
 port {
 minimum port-number;
 maximum port-number;
 }
 }
 }
 compression-device interface-name;
 copy-tos-to-outer-ip-header;
 demux-destination family;
 demux-source family;
 demux-options {
 underlying-interface interface-name;
 }
 description text;
 interface {
 l2tp-interface-id name;
 (dedicated | shared);
 }
 dialer-options {
 activation-delay seconds;
 callback;
 callback-wait-period time;
 deactivation-delay seconds;
 dial-string [dial-string-numbers];
 idle-timeout seconds;

```

```

incoming-map {
 caller caller-id | accept-all;
 initial-route-check seconds;
 load-interval seconds;
 load-threshold percent;
 pool pool-name;
 redial-delay time;
 watch-list {
 [routes];
 }
}
}
}
disable;
disable-mlppp-inner-ppp-pfc;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
 activation-priority priority;
 bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold cells plp1 cells;
family family-name {
 ... the family subhierarchy appears after the main [edit interfaces interface-name unit
 logical-unit-number] hierarchy ...
}
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
input-vlan-map {
 (pop | pop-pop | pop-swap | push | push-push | swap |
 swap-push | swap-swap);
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 tag-protocol-id tpid;
 vlan-id number;
}
interleave-fragments;
inverse-arp;
layer2-policer {
 input-policer policer-name;
 input-three-color policer-name;
 output-policer policer-name;
 output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
 up-count cells;
 down-count cells;
}
oam-period (disable | seconds);

```

```

output-vlan-map {
 (pop | pop-pop | pop-swap | push | push-push | swap |
 swap-push | swap-swap);
 inner-tag-protocol-id tpid;
 inner-vlan-id number;
 tag-protocol-id tpid;
 vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
 mtu (size | use-lower-layer);
 mru size;
 chap {
 access-profile name;
 default-chap-secret name;
 local-name name;
 passive;
 }
 compression {
 acfc;
 pfc;
 }
 dynamic-profile profile-name;
 lcp-restart-timer milliseconds;
 loopback-clear-timer seconds;
 ncp-restart-timer milliseconds;
 pap {
 access-profile name;
 default-pap-password password;
 local-name name;
 local-password password;
 passive;
 }
}
pppoe-options {
 access-concentrator name;
 auto-reconnect seconds;
 (client | server);
 service-name name;
 underlying-interface interface-name;
}
pppoe-underlying-options {
 access-concentrator name;
 direct-connect;
 dynamic-profile profile-name;
 max-sessions number;
}
proxy-arp;
service-domain (inside | outside);
shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst length);
 queue-length number;
}

```

```

}
short-sequence;
targeted-distribution;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
 backup-destination address;
 destination address;
 key number;
 routing-instance {
 destination routing-instance-name;
 }
 source source-address;
 ttl number;
}
vci vpi-identifier.vci-identifier;
vci-range start start-vci end end-vci;
vpi vpi-identifier;
vlan-id number;
vlan-id-range number-number;
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
family family {
 accounting {
 destination-class-usage;
 source-class-usage {
 (input | output | input output);
 }
 }
}
access-concentrator name;
address address {
 ... the address subhierarchy appears after the main [edit interfaces interface-name unit
 logical-unit-number family family-name] hierarchy ...
}
bundle interface-name;
core-facing;
demux-destination {
 destination-prefix;
}
demux-source {
 source-prefix;
}
direct-connect;
duplicate-protection;
dynamic-profile profile-name;
filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
}
interface-mode (access | trunk);
ipsec-sa sa-name;
keep-address-and-control;

```

```

mac-validate (loose | strict);
max-sessions number;
mtu bytes;
multicast-only;
no-redirects;
policer {
 arp policer-template-name;
 input policer-template-name;
 output policer-template-name;
}
primary;
protocols [inet iso mpls];
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check {
 fail-filter filter-name
 mode loose;
}
sampling {
 input;
 output;
}
service {
 input {
 post-service-filter filter-name;
 service-set service-set-name <service-filter filter-name>;
 }
 output {
 service-set service-set-name <service-filter filter-name>;
 }
}
service-name-table table-name
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name destination address
 destination-profile profile-name;
vlan-id number;
vlan-id-list [number number-number];
address address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 destination address;
 destination-profile name;
 eui-64;
 master-only;
 multipoint-destination address {
 dlci dlci-identifier;
 epd-threshold cells <plp1 cells>;
 inverse-arp;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 }
}

```

```

oam-period (disable | seconds);
shaping {
 (cbr rate | rtvbr burst length peak rate sustained rate | vbr burst length peak rate
 sustained rate);
 queue-length number;
}
vci vpi-identifier.vci-identifier;
}
preferred;
primary;
(vrrp-group | vrrp-inet6-group) group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-type authentication;
 authentication-key key;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority number;
 track {
 interface interface-name {
 bandwidth-threshold bits-per-second priority-cost number;
 }
 priority-hold-time seconds;
 route ip-address/prefix-length routing-instance instance-name priority-cost cost;
 }
 virtual-address [addresses];
 virtual-link-local-address ipv6-address;
 vrrp-inherit-from {
 active-interface interface-name;
 active-group group-number;
 }
}
}
}
}

```

**Hierarchy Level** [edit interfaces *interface-name*],  
[edit logical-systems *logical-system-name* interfaces *interface-name*],  
[edit interfaces *interface-set* *interface-set-name* interface *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

**Options** *logical-unit-number*—Number of the logical unit.  
**Range:** 0 through 1,073,741,823 for demux and PPPoE static interfaces. 0 through 16,385 for all other static interface types.

The remaining statements are explained separately.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

## unnumbered-address (Demux)

|                              |                                                                                                                                                                                                                                                                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                | <code>unnumbered-address interface-name &lt;preferred-source-address address&gt;;</code>                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>       | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit <a href="#">logical-systems</a> <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>   | Statement introduced in Junos OS Release 8.2.<br><b>preferred-source-address</b> option introduced in Junos OS Release 9.0.<br>IP demultiplexing interfaces supported in Junos OS Release 9.2.                                                                                                                                         |
| <b>Description</b>           | For IP demultiplexing interfaces, enable the local address to be derived from the specified interface. Configuring an unnumbered interface enables IP processing on the interface without assigning an explicit IP address to the interface.                                                                                           |
| <b>Options</b>               | <b>interface-name</b> —Name of the interface from which the local address is derived. The specified interface must have a logical unit number and a configured IP address, and must not be an unnumbered interface.<br><br>The <b>preferred-source-address</b> statement is explained separately.                                      |
| <b>Required Privilege</b>    | interface—To view this statement in the configuration.                                                                                                                                                                                                                                                                                 |
| <b>Level</b>                 | interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an Unnumbered Interface on page 195</a></li> <li>• <a href="#">address on page 397</a></li> <li>• <i>Junos System Basics Configuration Guide</i></li> </ul>                                                                                                           |

## unnumbered-address (Dynamic Profiles)

---

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>unnumbered-address interface-name &lt;preferred-source-address address&gt;;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | <code>[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number family family],</code><br><code>[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number family family]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.2.<br>\$junos-preferred-source-address variable support added in Junos OS Release 9.6.<br>Support for the \$junos-loopback-interface predefined variable introduced in Junos OS Release 9.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>         | <p>For Ethernet interfaces, enable the local address to be derived from the specified interface. Configuring unnumbered Ethernet interfaces enables IP processing on the interface without assigning an explicit IP address to the interface. To configure unnumbered address dynamically, include the \$junos-loopback-interface-address predefined variable.</p> <p>You can configure unnumbered address support on Ethernet interfaces for IPv4 and IPv6 address families.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>             | <p><b>interface-name</b>—Name of the interface from which the local address is derived. The specified interface must have a logical unit number, a configured IP address, and must not be an unnumbered interface. This value can be a specific interface name or the \$junos-loopback-interface dynamic variable.</p> <p>When defining the <b>unnumbered-address</b> statement using a static interface, keep the following in mind:</p> <ul style="list-style-type: none"><li>• If you choose to include the <b>routing-instance</b> statement at the [edit dynamic-profiles] hierarchy level, that statement must be configured with a valid, static routing instance value. In addition, whatever static unnumbered interface you specify must belong to that routing instance.</li><li>• If you choose to not include the <b>routing-instance</b> statement at the [edit dynamic-profiles] hierarchy level, the unnumbered-address statement uses the default routing instance. The use of the default routing instance requires that the unnumbered interface be configured statically and that it reside in the default routing instance.</li></ul> <p>When defining the <b>unnumbered-address</b> statement using the \$junos-loopback-interface dynamic variable, keep the following in mind:</p> <ul style="list-style-type: none"><li>• To use the \$junos-loopback-interface dynamic variable, the dynamic profile must also contain the <b>routing-instance</b> statement configured with the \$junos-routing-instance dynamic variable at the [edit dynamic-profiles] hierarchy level.</li><li>• The applied loopback interface is based on the dynamically obtained routing instance of the subscriber.</li></ul> |



**address**—(Optional) Secondary IP address of the donor interface. Configuring the preferred source address enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet interfaces in your network. This value can be a static IP address, the **\$junos-preferred-source-address** dynamic variable for the inet family, or **\$junos-preferred-source-ipv6-address** dynamic variable for the inet6 family.

When defining the **preferred-source-address** value using a static IP address, keep the following in mind:

- The unnumbered interface must be statically configured.
- The IP address specified as the **preferred-source-address** must be configured in the specified unnumbered interface.

When defining the **preferred-source-address** value using the **\$junos-preferred-source-address** or **\$junos-preferred-source-ipv6-address** dynamic variables, keep the following in mind:

- You must configure the **unnumbered-address** statement using the **\$junos-loopback-interface** dynamic variable.
- You must configure the **routing-instance** statement using the **\$junos-routing-instance** dynamic variable at the **[edit dynamic-profiles]** hierarchy level.
- The preferred source address chosen is based on the dynamically applied loopback address which is in turn derived from the dynamically obtained routing instance of the subscriber. The configured loopback address with the closest network match to the user IP address is selected as the preferred source address.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

|                              |                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <i>Dynamic Profiles Overview</i></li> </ul> |
|------------------------------|--------------------------------------------------------------------------------------|

## unnumbered-address (Ethernet)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>unnumbered-address interface-name &lt;preferred-source-address address&gt;;</code>                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> ],<br>[edit <a href="#">logical-systems</a> <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br><b>preferred-source-address</b> option introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                |
| <b>Description</b>              | For Ethernet interfaces, enable the local address to be derived from the specified interface. Configuring an unnumbered Ethernet interface enables IP processing on the interface without assigning an explicit IP address to the interface.                                                                                                               |
| <b>Options</b>                  | <b><i>interface-name</i></b> —Name of the interface from which the local address is derived. The specified interface must have a logical unit number and a configured IP address, and must not be an unnumbered interface.<br><br>The <b>preferred-source-address</b> statement is explained separately.                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an Unnumbered Interface on page 195</a></li><li>• <a href="#">address on page 397</a></li><li>• <i>Junos System Basics Configuration Guide</i></li></ul>                                                                                                                                   |

## unnumbered-address (PPP)

|                                 |                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>unnumbered-address interface-name destination address destination-profile profile-name;</code>                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">family</a> inet]                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For interfaces with PPP encapsulation, enable the local address to be derived from the specified interface.                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><i>interface-name</i>—Interface from which the local address is derived. The interface name must include a logical unit number and must have a configured address.</p> <p>The remaining statements are explained separately.</p>                                                                                          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options for Interfaces with PPP Encapsulation on page 193</a></li> <li>• <a href="#">address on page 397</a></li> <li>• <a href="#">negotiate-address on page 704</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul> |

## up-count

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>up-count <i>cells</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> oam-liveness]</code> ,<br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> oam-liveness]</code> ,<br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i> oam-liveness]</code> ,<br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> oam-liveness]</code> ,<br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i> oam-liveness]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the <code>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>]</code> hierarchy level.</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells received before a VC is declared up.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the ATM OAM F5 Loopback Cell Threshold</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

---

## user-prefix

---

|                                 |                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>user-prefix <i>user-prefix-string</i>;</code>                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                      |
| <b>Description</b>              | Specify the user prefix that is concatenated with the username during the subscriber authentication process.                                                                                                                                        |
| <b>Options</b>                  | <i>user-prefix-string</i> —The user prefix string.                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>                                                                                                                     |

## username-include

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>username-include {<br/>    circuit-type;<br/>    delimiter <i>delimiter-character</i>;<br/>    domain-name <i>domain-name-string</i>;<br/>    interface-name;<br/>    mac-address;<br/>    option-18;<br/>    option-37;<br/>    option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;<br/>    radius-realm <i>radius-realm-string</i>;<br/>    user-prefix <i>user-prefix-string</i>;<br/>}</pre>                                                                                                                                                                                                            |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication</a> ]                                                                                                                                                                                                                                                                                                                                                                                            |
| Release Information      | Statement introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description              | <p>Configure the username that the router passes to the external AAA server. You must include at least one of the optional statements for the username to be valid. If you do not configure a username, the router accesses the local authentication service only and does not use external authentication services, such as RADIUS.</p> <p>The username takes the format <b><i>user-prefix mac-address circuit-type option-82 interface-name domain-name radius-realm</i></b> with each component separated by whatever delimiter you choose.</p> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li><li>• <i>Using DHCP Option 82 Suboptions in Authentication Usernames for Autosense VLANs</i></li><li>• <i>Using DHCP Option 18 and Option 37 in Authentication Usernames for DHCPv6 Autosense VLANs</i></li></ul>                                                                                                                                                                                                                                                                  |

## vbr

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vbr peak <i>rate</i> sustained <i>rate</i> burst <i>length</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> <b>shaping</b>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ]</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>For ATM encapsulation only, define the variable bandwidth utilization in the traffic-shaping profile.</p> <p>When you configure the variable bandwidth utilization, you must specify all three options (<b>burst</b>, <b>peak</b>, and <b>sustained</b>). You can specify the rate in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify the rate in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>                  | If the <b>vbr</b> statement is not specified, bandwidth utilization is unlimited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>burst <i>length</i></b>—Burst length, in cells. If you set the length to 1, the peak traffic rate is used.<br/><b>Range:</b> 1 through 4000 cells</p> <p><b>peak <i>rate</i></b>—Peak rate, in bits per second or cells per second.<br/><b>Range:</b> For ATM1 interfaces, 33 Kbps through 135.6 Mbps (ATM OC3); 33 Kbps through 276 Mbps (ATM OC12). For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> <p><b>sustained <i>rate</i></b>—Sustained rate, in bits per second or cells per second.<br/><b>Range:</b> For ATM1 interfaces, 33 Kbps through 135.6 Mbps (ATM OC3); 33 Kbps through 276 Mbps (ATM OC12). For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM CBR</i></li> <li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

- [cbr on page 445](#)
- [rtvbr on page 825](#)
- [shaping on page 844](#)

---

## vc-cos-mode

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | vc-cos-mode (alternate   strict);                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options scheduler-maps <i>map-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | For ATM2 IQ interfaces only, specify packet-scheduling priority value for ATM2 IQ VC tunnels.                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>alternate</b>—VC CoS queue has high priority. The scheduling of the queues alternates between the high-priority queue and the remaining queues, so every other scheduled packet is from the high-priority queue.</p> <p><b>strict</b>—VC CoS queue has strictly high priority. A queue with strict high priority is always scheduled before the remaining queues. The remaining queues are scheduled in round-robin fashion.</p> <p><b>Default:</b> alternate</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM2 IQ VC Tunnel CoS Components Overview</i></li><li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li></ul>                                                                                                                                                                                                                                                                                                        |



## vci

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vci vpi-identifier.vci-identifier;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.</p>                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | <p>For ATM point-to-point logical interfaces only, configure the virtual circuit identifier (VCI) and virtual path identifier (VPI).</p> <p>To configure a VPI for a point-to-multipoint interface, specify the VPI in the <a href="#">multipoint-destination</a> statement.</p> <p>VCIs 0 through 31 are reserved for specific ATM values designated by the ATM Forum.</p>                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><b>vci-identifier</b>—ATM virtual circuit identifier. Unless you configure the interface to use promiscuous mode, this value cannot exceed the highest-numbered VC configured for the interface with the <b>maximum-vcs</b> option of the <b>vpi</b> statement.</p> <p><b>Range:</b> 0 through 4089 or 0 through 65,535 with promiscuous mode, with VCIs 0 through 31 reserved.</p> <p><b>vpi-identifier</b>—ATM virtual path identifier.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0</p>                                                                                 |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</a></li> <li>• <a href="#">Applying Scheduler Maps to Logical ATM Interfaces</a></li> <li>• <a href="#">multipoint-destination on page 694</a></li> <li>• <a href="#">promiscuous-mode on page 791</a></li> <li>• <a href="#">vpi (ATM CCC Cell-Relay Promiscuous Mode) on page 945</a></li> </ul>                                                                                                                                                                              |

## vci-range

---

|                                 |                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vci-range start <i>start-vci</i> end <i>end-vci</i>;</code>                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>vci-range</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                    |
| <b>Description</b>              | Range of VCI values used in ATM-to-Ethernet interworking cross-connects. VCI 0 through 31 are reserved. VCI 0 through 31 should not be used.                                                                     |
| <b>Options</b>                  | <b><i>start-vci</i></b> —Lowest number VCI in the range.<br><br><b><i>end-vci</i></b> —Highest number VCI in the range.<br><b>Range:</b> 0 through 255                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 254</a></li></ul>                                                                                           |

## virtual-switch

---

|                                 |                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>virtual-switch <i>name</i> bridge-domain <i>name</i> vlan-id [<i>vlan-ids</i> ];</code>                            |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> <i>domain-name</i> default-x]       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.                                                                            |
| <b>Description</b>              | Specify the routing-instance type as a virtual switch, under which bridge-domain MIPs must be enabled.                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring MIP for Bridge Domains of a Virtual Switch</a></li></ul> |

## vlan-id (Logical Port in Bridge Domain)

|                                 |                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge]                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 15.1.                                                                                                                                                      |
| <b>Description</b>              | The VLAN ID configured on the logical port. Received packets with no VLAN tags are forwarded within the bridge domain with the matching VLAN ID.                                                                                                     |
| <b>Options</b>                  | <b>number</b> —The VLAN ID.<br><b>Range:</b> 1 through 4095                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Access Mode on a Logical Interface</a></li> <li>• <a href="#">Tunnel Services Overview</a></li> <li>• <a href="#">Configuring Tunnel Interfaces on MX Series Routers</a></li> </ul> |

## vlan-id (Outer VLAN ID)

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-id <i>outer-vlan-id</i>;</code>                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                    |
| <b>Description</b>              | The outer VLAN ID to be used in ATM-to-Ethernet interworking cross-connects. Outer VLAN IDs are converted to the ATM VPI. The outer VLAN ID must match the VPI value configured. The allowable VPI range is 0 to 255. Do not configure the outer VLAN ID to be greater than 255. |
| <b>Options</b>                  | <b>outer-vlan-id</b> —Outer VLAN ID number.<br><b>Range:</b> 0 through 4094                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 254</a></li> </ul>                                                                                                                                                         |

## vlan-id (VLAN ID to Be Bound to a Logical Interface)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For Fast Ethernet, Gigabit Ethernet, and Aggregated Ethernet interfaces only, bind a 802.1Q VLAN tag ID to a logical interface.                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><i>number</i>—A valid VLAN identifier.</p> <p><b>Range:</b> For aggregated Ethernet, 4-port, 8-port, and 12-port Fast Ethernet PICs, and for management and internal Ethernet interfaces, 1 through 1023.</p> <p>For 48-port Fast Ethernet and Gigabit Ethernet PICs, 1 through 4094.</p> <p>VLAN ID 0 is reserved for tagging the priority of frames.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Mixed Tagging</i></li></ul>                                                                                                                                                                                                                                                                            |

## vlan-id (VLAN ID to Rewrite)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/>         [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>]</p>                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2, 10-Gigabit Ethernet LAN/WAN PIC, and IQ2-E interfaces and aggregated Ethernet using Gigabit Ethernet IQ interfaces, specify the line VLAN identifiers to be rewritten at the input or output interface.</p> <p>You cannot include the <b>vlan-id</b> statement with the <b>swap</b> statement, <b>swap-push</b> statement, <b>push-push</b> statement, or <b>push-swap</b> statement at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>] hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the <b>vlan-id</b> statement that you include at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>] hierarchy level.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting the VLAN Tag on Tagged Frames</i></li> <li>• <i>Binding VLAN IDs to Logical Interfaces</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## vlan-id-list (Ethernet VLAN Circuit)

|                            |                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>vlan-id-list [vlan-id vlan-id–vlan-id];</code>                                                                                                                                             |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.5.                                                                                                                                                    |
| <b>Description</b>         | Binds a single-tag logical interface to a list of VLAN IDs. Configures a logical interface to receive and forward any tag frame whose VLAN ID tag matches the list of VLAN IDs you specify.      |



### NOTE:

When you create a circuit cross-connect (CCC) using VLAN-bundled single-tag logical interfaces on Layer 2 VPN routing instances, the circuit automatically uses ethernet encapsulation. For Layer 2 VPN, you need to include the `encapsulation-type` statement and specify the value `ethernet` at either of the following hierarchy levels:

- [edit routing-instances *routing-instance-name* protocols l2vpn]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols l2vpn]

For more information about the `encapsulation-type` configuration statement and the Layer 2 encapsulation types `ethernet` and `ethernet-vlan`, see the *Junos OS VPNs Library for Routing Devices*.

|                |                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b> | <code>[vlan-id vlan-id–vlan-id]</code> —A list of valid VLAN ID numbers. Specify the VLAN IDs individually by using a space to separate each ID, as an inclusive list by separating the starting VLAN ID and ending VLAN ID with a hyphen, or as a combination of both.<br><b>Range:</b> 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames. |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**NOTE:** Configuring `vlan-id-list` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1-4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name
vlan-tagging;
unit number {
```

```
 vlan-id-range 1-4094;
 }

 [edit interfaces interface-name]
 unit 0;
```

---

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Binding VLAN IDs to Logical Interfaces*
- [encapsulation \(Logical Interface\) on page 522](#)
- [encapsulation \(Physical Interface\) on page 526](#)
- encapsulation-type (Layer 2 VPN routing instance), see the *Junos OS VPNs Library for Routing Devices*
- [flexible-vlan-tagging on page 555](#)
- [vlan-tagging on page 940](#)
- [vlan-tags \(Dual-Tagged Logical Interface\) on page 941](#)

## vlan-id-list (Interface in Bridge Domain)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-id-list [ <i>number number-number</i> ];</code>                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge]                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 15.1.                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Configure a logical interface to forward packets and learn MAC addresses within each bridge domain configured with a VLAN ID that matches a VLAN ID specified in the list. VLAN IDs can be entered individually using a space to separate each ID, entered as an inclusive list separating the starting VLAN ID and ending VLAN ID with a hyphen, or a combination of both. |
| <b>Options</b>                  | <i>number number</i> —Individual VLAN IDs separated by a space.<br><i>number-number</i> —Starting VLAN ID and ending VLAN ID in an inclusive range.<br><b>Range:</b> 1 through 4095                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Logical Interface for Trunk Mode</i></li><li>• <i>Configuring the VLAN ID List for a Trunk Interface</i></li><li>• <i>Tunnel Services Overview</i></li><li>• <i>Configuring Tunnel Interfaces on MX Series Routers</i></li></ul>                                                                                   |



## vlan-id-range

|                            |                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>vlan-id-range <i>vlan-id-vlan-id</i></code>                                                                                                                                                |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                                                                         |
| <b>Description</b>         | Bind a range of VLAN IDs to a logical interface.                                                                                                                                                 |
| <b>Options</b>             | <b>number</b> —The first number is the lowest VLAN ID in the range the second number is the highest VLAN ID in the range.<br><b>Range:</b> 1 through 4094                                        |



**NOTE:** Configuring `vlan-id-range` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1-4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name
vlan-tagging;
unit number {
 vlan-id-range 1-4094;
}

[edit interfaces interface-name
unit 0;
```

VLAN ID 0 is reserved for tagging the priority of frames.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Binding a Range of VLAN IDs to a Logical Interface</i></li> </ul>           |

## vlan-ranges

---

**Syntax**    `vlan-ranges {`  
              `access-profile profile-name;`  
              `authentication {`  
                  `packet-types [packet-types];`  
                  `password password-string;`  
                  `username-include {`  
                      `circuit-type;`  
                      `delimiter delimiter-character;`  
                      `domain-name domain-name-string;`  
                      `interface-name;`  
                      `mac-address;`  
                      `option-82 <circuit-id> <remote-id>;`  
                      `radius-realm radius-realm-string;`  
                      `user-prefix user-prefix-string;`  
                  `}`  
                  `}`  
              `dynamic-profile profile-name {`  
                  `accept (any | dhcp-v4 | inet);`  
                  `ranges (any | low-tag)–(any | high-tag);`  
                  `}`  
              `override;`  
              `}`

**Hierarchy Level**    [edit interfaces *interface-name* [auto-configure](#)]

**Release Information**    Statement introduced in Junos OS Release 9.5.

**Description**    Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.

                  The remaining statements are explained separately.

**Required Privilege Level**    routing—To view this statement in the configuration.  
                                  routing—control—To add this statement to the configuration.

**Related Documentation**

- *Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs*
- *Configuring Interfaces to Support Both Single and Stacked VLANs*

## vlan-rewrite

---

|                                 |                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | vlan-rewrite translate (200 500   201 501)                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> family bridge interface-mode trunk]<br>[edit interfaces <i>interface-name</i> unit <i>number</i> family ethernet-switching interface-mode trunk]                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.                                             |
| <b>Description</b>              | Translates an incoming VLAN to a bridge-domain VLAN, corresponding counter translation at egress. Supports translation of VLAN 200 to VLAN 500 and VLAN 201 to VLAN 501. Other valid VLANs pass through without translation.              |
| <b>Options</b>                  | <b>translate 200 500</b> —Translates incoming packets with VLAN 200 to 500.<br><b>translate 201 501</b> —Translates incoming packets with VLAN 201 to 501.<br><b>translate 202 502</b> —Translates incoming packets with VLAN 202 to 502. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting a VLAN Tag and Adding a New Tag</i></li> </ul>                                                                                                                                      |

## vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP)

---

|                                 |                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | vlan-rule (high-low   odd-even);                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic slot forwarding-mode <a href="#">vlan-steering</a> ]                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Configure the interoperation mode of the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4) when interoperating with 100 gigabit Ethernet interfaces from other vendors.</p> <p>If no VLAN rule is configured, all tagged packets are distributed to PFE0.</p>                   |
| <b>Options</b>                  | <p><b>high-low</b>—VLAN IDs 1 through 2047 are distributed to PFE0 and VLAN IDs 2048 through 4096 are distributed to PFE1.</p> <p><b>odd-even</b>—Odd number VLAN IDs are distributed to PFE1 and even number VLAN IDs are distributed to PFE0.</p>                                         |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP</i></li><li>• <i>forwarding-mode (100-Gigabit Ethernet)</i></li><li>• <a href="#">vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP) on page 939</a></li></ul> |

---

## vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vlan-steering {<br/>    <a href="#">vlan-rule</a> (high-low   odd-even);<br/>}</code>                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic slot forwarding-mode]                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>Configure the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4) to interoperate with 100 gigabit Ethernet interfaces from other vendors.</p> <p>The other statement is explained separately.</p>                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP</i></li><li>• <i>forwarding-mode (100-Gigabit Ethernet)</i></li><li>• <a href="#">sa-multicast (100-Gigabit Ethernet) on page 827</a></li><li>• <a href="#">vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP) on page 938</a></li></ul> |

## vlan-tagging

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | vlan-tagging;                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 13.2 for PTX Series Routers.<br>Statement introduced in Junos OS Release 14.1X53-D10 for the QFX Series. |
| <b>Description</b>              | For Fast Ethernet and Gigabit Ethernet interfaces and aggregated Ethernet interfaces configured for VPLS, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface.                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>802.1Q VLANs Overview</i></li><li>• <i>vlan-id</i></li><li>• <i>Configuring a Layer 3 Subinterface (CLI Procedure)</i></li><li>• <i>Configuring Tagged Aggregated Ethernet Interfaces</i></li><li>• <i>Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch</i></li></ul>                |

## vlan-tags (Dual-Tagged Logical Interface)

|                            |                                                                                                                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>vlan-tags inner-list [<i>vlan-id vlan-id-vlan-id</i>] outer &lt;<i>tpid</i>&gt;<i>vlan-id</i>;</code>                                                                                                                     |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code>        |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.5.                                                                                                                                                                                   |
| <b>Description</b>         | (MX Series routers only) Binds a dual-tag logical interface to a list of VLAN IDs. Configures the logical interface to receive and forward any dual-tag frame whose inner VLAN ID tag matches the list of VLAN IDs you specify. |



### NOTE:

To create a circuit cross-connect (CCC) using VLAN-bundled dual-tag logical interfaces on Layer 2 VPN routing instances, you must include the `encapsulation-type` statement and specify the value `ethernet-vlan` at the one of the following hierarchy levels:

- `[edit routing-instances routing-instance-name protocols l2vpn]`
- `[edit logical-systems logical-system-name routing-instances routing-instance-name protocols l2vpn]`

For more information about the `encapsulation-type` configuration statement and the Layer 2 encapsulation types `ethernet` and `ethernet-vlan`, see the *Junos OS VPNs Library for Routing Devices*.

**Options** `inner-list [vlan-id vlan-id vlan-id-vlan-id]`—A list of valid VLAN ID numbers. Specify the VLAN IDs individually by using a space to separate each ID, as an inclusive list by separating the starting VLAN ID and ending VLAN ID with a hyphen, or as a combination of both.

**Range:** 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.

`outer <tpid>vlan-id`—An optional Tag Protocol ID (TPID) and a valid VLAN ID.

**Range:** For TPID, specify a hexadecimal value in the format `0xnnnn`.

**Range:** For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.



**NOTE:** Configuring `inner-list` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1 through 4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name]
vlan-tagging;
unit number {
 vlan-tags outer vid inner-list 1-4094;
}

[edit interfaces interface-name]
vlan-tagging;
unit number {
 vlan-id vid;
}
```

---

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Binding VLAN IDs to Logical Interfaces</i></li><li>• <a href="#">encapsulation (Logical Interface) on page 522</a></li><li>• <a href="#">encapsulation (Physical Interface) on page 526</a></li><li>• encapsulation-type (Layer 2 VPN routing instance), see the <i>Junos OS VPNs Library for Routing Devices</i>.</li><li>• <a href="#">flexible-vlan-tagging on page 555</a></li><li>• <a href="#">vlan-id-list (Ethernet VLAN Circuit) on page 932</a></li><li>• <a href="#">vlan-tagging on page 940</a></li></ul> |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## vlan-tags (Stacked VLAN Tags)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>vlan-tags inner <i>tpid.vlan-id</i> inner-range <i>vid1—vid2</i> outer <i>tpid.vlan-id</i>;</code>                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                                                                                                                                                                                                                                                     |
| <b>Description</b>         | For Gigabit Ethernet IQ and IQE interfaces only, bind TPIDs and 802.1Q VLAN tag IDs to a logical interface.                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>             | <b>inner <i>tpid.vlan-id</i></b> —A TPID and a valid VLAN identifier.<br><b>Range:</b> (most routers) For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames. For PTX Series, VLAN ID 0 is not supported.<br><b>inner-range <i>tpid. vid1—vid2</i></b> —Specify a TPID and a range of VLAN IDs where <i>vid1</i> is the start of the range and <i>vid2</i> is the end of the range. |



**NOTE:** On the network-to-network (NNI) or egress interfaces of provider edge (PE) routers, you cannot configure the inner-range *tpid. vid1—vid2* option with the `vlan-tags` statement for ISP-facing interfaces.

**Range:** For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.

**outer *tpid.vlan-id***—A TPID and a valid VLAN identifier.

**Range:** (most routers) For VLAN ID, 1 through 511 for normal interfaces, and 512 through 4094 for VLAN CCC interfaces. VLAN ID 0 is reserved for tagging the priority of frames. For PTX Series, VLAN ID 0 is not supported.



**NOTE:** Configuring inner-range with the entire `vlan-id` range consumes system resources and is not a best practice. It should be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1–4094), it has the same result as not specifying a range; however, it consumes Packet Forwarding Engine resources such as VLAN lookup table entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name]
stacked-vlan-tagging;
unit number {
 vlan-tags outer vid inner-range 1-4094;
}
```

```
[edit interfaces interface-name]
vlan-tagging;
unit number {
 vlan-id vid;
}
```

---

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Configuring Dual VLAN Tags*
- *Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers*
- [stacked-vlan-tagging on page 860](#)

---

## vlan-tags-outer

---

**Syntax** `vlan-tags-outer vlan-tag;`

**Hierarchy Level** [edit interfaces [interface-set](#) *interface-set-name* interface *interface-name*]

**Release Information** Statement introduced in Junos OS Release 8.5.

**Description** The S-VLAN outer tag that belongs to a set of interfaces used to configure hierarchical CoS schedulers.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- *Class of Service Feature Guide for Routing Devices*

---

## vlan-vci-tagging

---

**Syntax** `vlan-vci-tagging;`

**Hierarchy Level** [edit interfaces *interface-name*],  
[edit logical-systems *logical-system-name* interfaces *interface-name*]

**Release Information** Statement introduced in Junos OS Release 9.0.

**Description** Enable the ATM-to-Ethernet interworking cross-connect function on a Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet interface.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring ATM-to-Ethernet Interworking on page 254](#)

## vpi (ATM CCC Cell-Relay Promiscuous Mode)

|                                 |                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vpi vpi-identifier;</code>                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options promiscuous-mode</a> ]                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Junos OS Release 12.2 for the ACX Series Universal Access routers.                                                                                                                                                                    |
| <b>Description</b>              | For ATM interfaces, allow all VCI in this VPI to open in ATM CCC cell-relay mode.<br><br>When you include <b>vpi</b> statements at the [edit interfaces <i>interface-name</i> <a href="#">atm-options promiscuous-mode</a> ] hierarchy level, the specified VPIs open in promiscuous mode. |
| <b>Options</b>                  | <b>vpi-identifier</b> —ATM virtual path identifier. This is one of the VPIs that you define in the <b>vci</b> statement. (For a list of hierarchy levels at which you can include the <b>vci</b> statement, see <a href="#">vci</a> .)<br><br><b>Range:</b> 0 through 255                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring ATM Cell-Relay Promiscuous Mode</i></li> </ul>                                                                                                                                                                                       |

## vpi (Define Virtual Path)

---

|                     |                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax              | <pre>vpi vpi-identifier {<br/>    maximum-vcs maximum-vcs;<br/>    oam-liveness {<br/>        up-count cells;<br/>        down-count cells;<br/>    }<br/>    oam-period (disable   seconds);<br/>    shaping {<br/>        (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst<br/>         length);<br/>        queue-length number;<br/>    }<br/>}</pre> |
| Hierarchy Level     | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> ]                                                                                                                                                                                                                                                                                                                                |
| Release Information | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                     |
| Description         | For ATM interfaces, configure the virtual path (VP).                                                                                                                                                                                                                                                                                                                                                  |



**NOTE:** Certain options apply only to specific platforms.

---

|                          |                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Options                  | <p><b>vpi-identifier</b>—ATM virtual path identifier. This is one of the VPIs that you define in the <a href="#">vci</a> statement. (For a list of hierarchy levels at which you can include the <a href="#">vci</a> statement, see <a href="#">vci</a>.)</p> <p><b>Range:</b> 0 through 255</p> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                    |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Maximum Number of ATM1 VCs on a VP</a></li><li>• <a href="#">multipoint-destination on page 694</a></li><li>• <a href="#">promiscuous-mode on page 791</a></li><li>• <a href="#">vci on page 927</a></li></ul>                                                                         |

## vpi (Logical Interface and Interworking)

|                                 |                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vpi virtual-path-identifier;</code>                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.                                                                        |
| <b>Description</b>              | VPI used in an ATM-to-Ethernet interworking cross-connect.                                                                                                                                                         |
| <b>Options</b>                  | <b>virtual-path-identifier</b> —VPI to be used.<br><b>Range:</b> 0 through 255                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 254</a></li> <li>• <a href="#">Configuring ATM Cell-Relay Promiscuous Mode</a></li> </ul>                    |

## vtmapping

|                                 |                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>vtmapping (itu-t   klm);</code>                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options];<br>[edit chassis <i>fpc number</i> <i>pic number</i> ]                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                                            |
| <b>Description</b>              | For the Channelized STM1 IQ PIC or Channelized STM1 PIC, configure virtual tributary mapping.<br><br>For the Channelized STM1 PIC, you configure virtual tributary mapping at the [edit chassis <i>fpc number</i> <i>pic number</i> ] hierarchy level.       |
| <b>Options</b>                  | <b>itu-t</b> —International Telephony Union standard.<br><br><b>klm</b> —KLM standard.<br><b>Default:</b> klm                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Virtual Tributary Mapping of Channelized STM1 Interfaces</a></li> <li>• <a href="#">Configuring the Junos OS to Support Channelized STM1 Interface Virtual Tributary Mapping</a></li> </ul> |

## warning

---

|                                 |                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>warning low-light-warning {<br/>  (link-down   syslog);<br/>}</code>                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> optics-options]                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for PTX Series routers.                                                                                  |
| <b>Description</b>              | Specifies the action to take if the receiving optics signal is below the optics low-light warning threshold.                                                                                                                                                                      |
| <b>Options</b>                  | <b>link-down</b> —Drop the 10-Gigabit Ethernet link and marks link as down.<br><b>syslog</b> —Write the optics information to the system log.                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i></li><li>• <a href="#">optics-options on page 735</a></li><li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li></ul> |

## wavelength

|                            |                                                                                                                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>wavelength nm;</code>                                                                                                                                                                         |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>optics-options</b> ]                                                                                                                                      |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for PTX Series routers. |
| <b>Description</b>         | For 10-Gigabit or 100-Gigabit Ethernet DWDM interfaces only, configure full C-band ITU-Grid tunable optics.                                                                                         |
| <b>Options</b>             | <i>nm</i> —Wavelength value. It can be one of the following:                                                                                                                                        |



**NOTE:** All values are displayed. However, if you configure a value that is not supported by the device, an error message is displayed and the device is not tuned to the specified wavelength.

- **1528.38**—1528.38 nanometers (nm), corresponds to a 50-GHz grid
- **1528.77**—1528.77 nm, corresponds to 50-GHz and 100-GHz grids
- **1529.16**—1529.16 nm, corresponds to a 50-GHz grid
- **1529.55**—1529.55 nm, corresponds to 50-GHz and 100-GHz grids
- **1529.94**—1529.94 nm, corresponds to a 50-GHz grid
- **1530.33**—1530.33 nm, corresponds to 50-GHz and 100-GHz grids
- **1530.72**—1530.72 nm, corresponds to a 50-GHz grid
- **1531.12**—1531.12 nm, corresponds to 50-GHz and 100-GHz grids
- **1531.51**—1531.51 nm, corresponds to a 50-GHz grid
- **1531.90**—1531.90 nm, corresponds to 50-GHz and 100-GHz grids
- **1532.29**—1532.29 nm, corresponds to a 50-GHz grid
- **1532.68**—1532.68 nm, corresponds to 50-GHz and 100-GHz grids
- **1533.07**—1533.07 nm, corresponds to a 50-GHz grid
- **1533.47**—1533.47 nm, corresponds to 50-GHz and 100-GHz grids
- **1533.86**—1533.86 nm, corresponds to a 50-GHz grid
- **1534.25**—1534.25 nm, corresponds to 50-GHz and 100-GHz grids
- **1534.64**—1534.64 nm, corresponds to a 50-GHz grid
- **1535.04**—1535.04 nm, corresponds to 50-GHz and 100-GHz grids

- **1535.43**—1535.43 nm, corresponds to a 50-GHz grid
- **1535.82**—1535.82 nm, corresponds to 50-GHz and 100-GHz grids
- **1536.22**—1536.22 nm, corresponds to a 50-GHz grid
- **1536.61**—1536.61 nm, corresponds to 50-GHz and 100-GHz grids
- **1537.00**—1537.00 nm, corresponds to a 50-GHz grid
- **1537.40**—1537.40 nm, corresponds to 50-GHz and 100-GHz grids
- **1537.79**—1537.79 nm, corresponds to a 50-GHz grid
- **1538.19**—1538.19 nm, corresponds to 50-GHz and 100-GHz grids
- **1538.58**—1538.58 nm, corresponds to a 50-GHz grid
- **1538.98**—1538.98 nm, corresponds to 50-GHz and 100-GHz grids
- **1539.37**—1539.37 nm, corresponds to a 50-GHz grid
- **1539.77**—1539.77 nm, corresponds to 50-GHz and 100-GHz grids
- **1540.16**—1540.16 nm, corresponds to a 50-GHz grid
- **1540.56**—1540.56 nm, corresponds to 50-GHz and 100-GHz grids
- **1540.95**—1540.95 nm, corresponds to a 50-GHz grid
- **1541.35**—1541.35 nm, corresponds to 50-GHz and 100-GHz grids
- **1541.75**—1541.75 nm, corresponds to a 50-GHz grid
- **1542.14**—1542.14 nm, corresponds to 50-GHz and 100-GHz grids
- **1542.54**—1542.54 nm, corresponds to a 50-GHz grid
- **1542.94**—1542.94 nm, corresponds to 50-GHz and 100-GHz grids
- **1543.33**—1543.33 nm, corresponds to a 50-GHz grid
- **1543.73**—1543.73 nm, corresponds to 50-GHz and 100-GHz grids
- **1544.13**—1544.13 nm, corresponds to a 50-GHz grid
- **1544.53**—1544.53 nm, corresponds to 50-GHz and 100-GHz grids
- **1544.92**—1544.92 nm, corresponds to a 50-GHz grid
- **1545.32**—1545.32 nm, corresponds to 50-GHz and 100-GHz grids
- **1545.72**—1545.72 nm, corresponds to a 50-GHz grid
- **1546.12**—1546.12 nm, corresponds to 50-GHz and 100-GHz grids
- **1546.52**—1546.52 nm, corresponds to a 50-GHz grid
- **1546.92**—1546.92 nm, corresponds to 50-GHz and 100-GHz grids
- **1547.32**—1547.32 nm, corresponds to a 50-GHz grid
- **1547.72**—1547.72 nm, corresponds to 50-GHz and 100-GHz grids
- **1548.11**—1548.11 nm, corresponds to a 50-GHz grid



- **1548.51**—1548.51 nm, corresponds to 50-GHz and 100-GHz grids
- **1548.91**—1548.91 nm, corresponds to a 50-GHz grid
- **1549.32**—1549.32 nm, corresponds to 50-GHz and 100-GHz grids
- **1549.72**—1549.72 nm, corresponds to a 50-GHz grid
- **1550.12**—1550.12 nm, corresponds to 50-GHz and 100-GHz grids
- **1550.52**—1550.52 nm, corresponds to a 50-GHz grid
- **1550.92**—1550.92 nm, corresponds to 50-GHz and 100-GHz grids
- **1551.32**—1551.32 nm, corresponds to a 50-GHz grid
- **1551.72**—1551.72 nm, corresponds to 50-GHz and 100-GHz grids
- **1552.12**—1552.12 nm, corresponds to a 50-GHz grid
- **1552.52**—1552.52 nm, corresponds to 50-GHz and 100-GHz grids
- **1552.93**—1552.93 nm, corresponds to a 50-GHz grid
- **1553.33**—1554.33 nm, corresponds to 50-GHz and 100-GHz grids
- **1553.73**—1554.73 nm, corresponds to a 50-GHz grid
- **1554.13**—1554.13 nm, corresponds to 50-GHz and 100-GHz grids
- **1554.54**—1554.54 nm, corresponds to a 50-GHz grid
- **1554.94**—1554.94 nm, corresponds to 50-GHz and 100-GHz grids
- **1555.34**—1555.34 nm, corresponds to a 50-GHz grid
- **1555.75**—1555.75 nm, corresponds to 50-GHz and 100-GHz grids
- **1556.15**—1556.15 nm, corresponds to a 50-GHz grid
- **1556.55**—1556.55 nm, corresponds to 50-GHz and 100-GHz grids
- **1556.96**—1556.96 nm, corresponds to a 50-GHz grid
- **1557.36**—1557.36 nm, corresponds to 50-GHz and 100-GHz grids
- **1557.77**—1557.77 nm, corresponds to a 50-GHz grid
- **1558.17**—1558.17 nm, corresponds to 50-GHz and 100-GHz grids
- **1558.58**—1558.58 nm, corresponds to a 50-GHz grid
- **1558.98**—1558.98 nm, corresponds to 50-GHz and 100-GHz grids
- **1559.39**—1559.39 nm, corresponds to a 50-GHz grid
- **1559.79**—1559.79 nm, corresponds to 50-GHz and 100-GHz grids
- **1560.20**—1560.20 nm, corresponds to a 50-GHz grid
- **1560.61**—1560.61 nm, corresponds to 50-GHz and 100-GHz grids
- **1561.01**—1561.01 nm, corresponds to a 50-GHz grid
- **1561.42**—1561.42 nm, corresponds to 50-GHz and 100-GHz grids

- **1561.83**—1561.83 nm, corresponds to a 50-GHz grid
- **1562.23**—1562.23 nm, corresponds to 50-GHz and 100-GHz grids
- **1562.64**—1562.64 nm, corresponds to a 50-GHz grid
- **1563.05**—1563.05 nm, corresponds to 50-GHz and 100-GHz grids
- **1563.45**—1563.45 nm, corresponds to a 50-GHz grid
- **1563.86**—1563.86 nm, corresponds to 50-GHz and 100-GHz grids
- **1564.27**—1564.27 nm, corresponds to a 50-GHz grid
- **1564.68**—1564.68 nm, corresponds to 50-GHz and 100-GHz grids
- **1565.09**—1565.09 nm, corresponds to a 50-GHz grid
- **1565.50**—1565.50 nm, corresponds to 50-GHz and 100-GHz grids
- **1565.90**—1565.90 nm, corresponds to a 50-GHz grid
- **1566.31**—1566.31 nm, corresponds to 50-GHz and 100-GHz grids
- **1566.72**—1566.72 nm, corresponds to a 50-GHz grid
- **1567.13**—1567.13 nm, corresponds to 50-GHz and 100-GHz grids
- **1567.54**—1567.54 nm, corresponds to a 50-GHz grid
- **1567.95**—1567.95 nm, corresponds to 50-GHz and 100-GHz grids
- **1568.36**—1568.36 nm, corresponds to a 50-GHz grid
- **1568.77**—1568.77 nm, corresponds to 50-GHz and 100-GHz grids

**Default:** 1550.12—1550.12 nm, corresponds to 50-GHz and 100-GHz grids

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Required Privilege</b> | interface—To view this statement in the configuration.        |
| <b>Level</b>              | interface-control—To add this statement to the configuration. |

|                              |                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Ethernet DWDM Interface Wavelength Overview</i></li><li>• <i>Configuring the 10-Gigabit or 100-Gigabit Ethernet DWDM Interface Wavelength</i></li><li>• <i>show interfaces diagnostics optics (Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, 100-Gigabit Ethernet, and Virtual Chassis Port)</i></li></ul> |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## west-interface

**Syntax**

```
west-interface {
 node-id mac-address;
 control-channel channel-name {
 vlan number;
 interface name interface-name
 }
 interface-none
 ring-protection-link-end;
 virtual-control-channel {
 west-interface name;
 east-interface name;
 }
}
```

**Hierarchy Level** [edit protocols [protection-group ethernet-ring ring-name](#)]

**Release Information** Statement introduced in Junos OS Release 9.5.  
Statement introduced in Junos OS Release 12.1 for EX Series switches.  
Statement introduced in Junos OS Release 14.153-D10 for QFX Series switches.

**Description** Define one of the two interface ports for Ethernet ring protection, the other being defined by the **east-interface** statement at the same hierarchy level. The interface must use the control channel's logical interface name. The control channel is a dedicated VLAN channel for the ring port.



**NOTE:** Always configure this port second, after configuring the **east-interface** statement.

The statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

- Related Documentation**
- *Ethernet Ring Protection Switching Overview*
  - *Ethernet Ring Protection Using Ring Instances for Load Balancing*
  - [east-interface on page 519](#)
  - [ethernet-ring on page 537](#)
  - *Example: Configuring Ethernet Ring Protection Switching on EX Series Switches*
  - *Example: Configuring Ethernet Ring Protection Switching on QFX Series and EX Series Switches Supporting ELS*
  - *Configuring Ethernet Ring Protection Switching (CLI Procedure)*

## working-circuit

---

|                                 |                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>working-circuit <i>group-name</i>;</code>                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                            |
| <b>Description</b>              | Configure the working router in an APS circuit pair.                                                                                                         |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name.                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li><li>• <a href="#">protect-circuit on page 792</a></li></ul> |

## yellow-differential-delay

---

|                                 |                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>yellow-differential-delay <i>milliseconds</i>;</code>                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                                  |
| <b>Description</b>              | For link services and voices interfaces only, configure the yellow differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.                               |
| <b>Options</b>                  | <i>milliseconds</i> —Yellow differential delay threshold.<br><b>Range:</b> 1 through 2000 milliseconds<br><b>Default:</b> 6 milliseconds                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">action-red-differential-delay on page 396</a></li><li>• <a href="#">remote on page 810</a></li></ul> |

---

## z0-increment

---

|                                 |                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (z0-increment   no-z0-increment);                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                |
| <b>Description</b>              | Configure an incremental STM ID rather than a static one.                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Incrementing STM ID to Interoperate with Older Equipment in SDH Mode</i></li><li>• <a href="#">sonet-options on page 849</a></li></ul> |



# Interface Operational Commands

- [Common Output Fields Description on page 958](#)
- [Improvements to Interface Transmit Statistics Reporting on page 965](#)
- [show interfaces \(10-Gigabit Ethernet\)](#)
- [show interfaces \(ATM\)](#)
- [show interfaces \(Channelized DS3-to-DS0\)](#)
- [show interfaces \(Channelized DS3-to-DS1\)](#)
- [show interfaces \(Channelized E1 IQ\)](#)
- [show interfaces \(Channelized E1\)](#)
- [show interfaces \(Channelized OC12 IQ and IQE\)](#)
- [show interfaces \(Channelized OC12\)](#)
- [show interfaces \(Channelized OC3 IQ and IQE\)](#)
- [show interfaces \(Channelized STM1 IQ\)](#)
- [show interfaces \(Channelized STM1\)](#)
- [show interfaces \(Channelized T1 IQ\)](#)
- [show interfaces \(Channelized T3 IQ\)](#)
- [show interfaces \(Discard\)](#)
- [show interfaces \(Fast Ethernet\)](#)
- [show interfaces \(Gigabit Ethernet\)](#)
- [show interfaces \(M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet\)](#)
- [show interfaces \(PPPoE\)](#)
- [show interfaces \(PTX Series Packet Transport Routers\)](#)
- [show interfaces \(SONET/SDH\)](#)
- [show interfaces \(Serial\)](#)
- [show interfaces \(T1, E1, or DS\)](#)
- [show interfaces \(T3 or E3\)](#)
- [show interfaces demux0 \(Demux Interfaces\)](#)
- [show interfaces extensive](#)

- `show interfaces lsi` (Label-Switched Interface)
- `show interfaces media`
- `show interfaces terse`

## Common Output Fields Description

---

This chapter explains the content of the output fields, which appear in the output of most **show interfaces** commands.

### Damping Field

For the physical interface, the Damping field shows the setting of the following damping parameters:

- **half-life**—Decay half-life. The number of seconds after which the accumulated interface penalty counter is reduced by half if the interface remains stable.
- **max-suppress**—Maximum hold-down time. The maximum number of seconds that an interface can be suppressed irrespective of how unstable the interface has been.
- **reuse**—Reuse threshold. When the accumulated interface penalty counter falls below this number, the interface is no longer suppressed.
- **suppress**—Cutoff (suppression) threshold. When the accumulated interface penalty counter exceeds this number, the interface is suppressed.
- **state**—Interface damping state. If damping is enabled on an interface, it is suppressed during interface flaps that match the configured damping parameters.

### Destination Class Field

For the logical interface, the **Destination class** field provides the names of destination class usage (DCU) counters per family and per class for a particular interface. The counters display packets and bytes arriving from designated user-selected prefixes. For example:

| Destination class | Packets<br>(packet-per-second) | Bytes<br>(bits-per-second) |
|-------------------|--------------------------------|----------------------------|
| gold              | 1928095                        | 161959980                  |
|                   | ( 889)                         | ( 597762)                  |
| bronze            | 0                              | 0                          |
|                   | ( 0)                           | ( 0)                       |
| silver            | 0                              | 0                          |
|                   | ( 0)                           | ( 0)                       |

### Enabled Field

For the physical interface, the **Enabled** field provides information about the state of the interface, displaying one or more of the following values:

- **Administratively down, Physical link is Down**—The interface is turned off, and the physical link is inoperable and cannot pass packets even when it is enabled. To change the interface state to **Enabled**, use the following command:



```
user@host# set interfaces interface enable
```

Manually verify the connections to bring the physical link up.

- **Administratively down, Physical link is Up**—The interface is turned off, but the physical link is operational and can pass packets when it is enabled. To change the interface state to **Enabled**, use the following command:

```
user@host# set interfaces interface enable
```

- **Enabled, Physical link is Down**—The interface is turned on, but the physical link is inoperable and cannot pass packets. Manually verify the connections to bring the physical link up.
- **Enabled, Physical link is Up**—The interface is turned on, and the physical link is operational and can pass packets.

## Filters Field

For the logical interface, the **Filters** field provides the name of the firewall filters to be evaluated when packets are received or transmitted on the interface. The format is **Filters: Input: *filter-name* and Filters: Output: *filter-name***. For example:

```
Filters: Input: sample-all
```

```
Filters: Output: cp-ftp
```

## Flags Fields

The following sections provide information about flags that are specific to interfaces:

- [Addresses, Flags Field on page 959](#)
- [Device Flags Field on page 960](#)
- [Family Flags Field on page 960](#)
- [Interface Flags Field on page 961](#)
- [Link Flags Field on page 962](#)
- [Logical Interface Flags Field on page 962](#)

### Addresses, Flags Field

---

The **Addresses, Flags** field provides information about the addresses configured for the protocol family on the logical interface and displays one or more of the following values:

- **Dest-route-down**—The routing process detected that the link was not operational and changed the interface routes to nonforwarding status
- **Is-Default**—The default address of the router used as the source address by SNMP, ping, traceroute, and other network utilities.
- **Is-Preferred**—The default local address for packets originating from the local router and sent to destinations on the subnet.
- **Is-Primary**—The default local address for broadcast and multicast packets originated locally and sent out the interface.
- **Preferred**—This address is a candidate to become the preferred address.

- **Primary**—This address is a candidate to become the primary address.
- **Trunk**—Interface is a trunk.
- **Trunk, Inter-Switch-Link**—Interface is a trunk, and InterSwitch Link protocol (ISL) is configured on the trunk port of the primary VLAN in order to connect the routers composing the PVLAN to each other.

---

### Device Flags Field

The **Device flags** field provides information about the physical device and displays one or more of the following values:

- **Down**—Device has been administratively disabled.
- **Hear-Own-Xmit**—Device receives its own transmissions.
- **Link-Layer-Down**—The link-layer protocol has failed to connect with the remote endpoint.
- **Loopback**—Device is in physical loopback.
- **Loop-Detected**—The link layer has received frames that it sent, thereby detecting a physical loopback.
- **No-Carrier**—On media that support carrier recognition, no carrier is currently detected.
- **No-Multicast**—Device does not support multicast traffic.
- **Present**—Device is physically present and recognized.
- **Promiscuous**—Device is in promiscuous mode and recognizes frames addressed to all physical addresses on the media.
- **Quench**—Transmission on the device is quenched because the output buffer is overflowing.
- **Recv-All-Multicasts**—Device is in multicast promiscuous mode and therefore provides no multicast filtering.
- **Running**—Device is active and enabled.

---

### Family Flags Field

The **Family flags** field provides information about the protocol family on the logical interface and displays one or more of the following values:

- **DCU**—Destination class usage is enabled.
- **Dest-route-down**—The software detected that the link is down and has stopped forwarding the link's interface routes.
- **Down**—Protocol is inactive.
- **Is-Primary**—Interface is the primary one for the protocol.
- **Mac-Validate-Loose**—Interface is enabled with loose MAC address validation.
- **Mac-Validate-Strict**—Interface is enabled with strict MAC address validation.

- **Maximum labels**—Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.
- **MTU-Protocol-Adjusted**—The effective MTU is not the configured value in the software.
- **No-Redirects**—Protocol redirects are disabled.
- **Primary**—Interface can be considered for selection as the primary family address.
- **Protocol-Down**—Protocol failed to negotiate correctly.
- **SCU-in**—Interface is configured for source class usage input.
- **SCU-out**—Interface is configured for source class usage output.
- **send-bcast-packet-to-re**—Interface is configured to forward IPv4 broadcast packets to the Routing Engine.
- **targeted-broadcast**—Interface is configured to forward IPv4 broadcast packets to the LAN interface and the Routing Engine.
- **Unnumbered**—Protocol family is configured for unnumbered Ethernet. An unnumbered Ethernet interface borrows an IPv4 address from another interface, which is referred to as the donor interface.
- **Up**—Protocol is configured and operational.
- **uRPF**—Unicast Reverse Path Forwarding is enabled.

---

### Interface Flags Field

The **Interface flags** field provides information about the physical interface and displays one or more of the following values:

- **Admin-Test**—Interface is in test mode and some sanity checking, such as loop detection, is disabled.
- **Disabled**—Interface is administratively disabled.
- **Down**—A hardware failure has occurred.
- **Hardware-Down**—Interface is nonfunctional or incorrectly connected.
- **Link-Layer-Down**—Interface keepalives have indicated that the link is incomplete.
- **No-Multicast**—Interface does not support multicast traffic.
- **No-receive No-transmit**—Passive monitor mode is configured on the interface.
- **OAM-On-SVLAN**—(MX Series routers with MPC/MIC interfaces only) Interface is configured to propagate the Ethernet OAM state of a static, single-tagged service VLAN (S-VLAN) on a Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet interface to a dynamic or static double-tagged customer VLAN (C-VLAN) that has the same S-VLAN (outer) tag as the S-VLAN.
- **Point-To-Point**—Interface is point-to-point.

- **Pop all MPLS labels from packets of depth**—MPLS labels are removed as packets arrive on an interface that has the **pop-all-labels** statement configured. The depth value can be one of the following:
  - **1**—Takes effect for incoming packets with one label only.
  - **2**—Takes effect for incoming packets with two labels only.
  - **[ 1 2 ]**—Takes effect for incoming packets with either one or two labels.
- **Promiscuous**—Interface is in promiscuous mode and recognizes frames addressed to all physical addresses.
- **Recv-All-Multicasts**—Interface is in multicast promiscuous mode and provides no multicast filtering.
- **SNMP-Traps**—SNMP trap notifications are enabled.
- **Up**—Interface is enabled and operational.

---

#### Link Flags Field

The **Link flags** field provides information about the physical link and displays one or more of the following values:

- **ACFC**—Address control field compression is configured. The Point-to-Point Protocol (PPP) session negotiates the ACFC option.
- **Give-Up**—Link protocol does not continue connection attempts after repeated failures.
- **Loose-LCP**—PPP does not use the Link Control Protocol (LCP) to indicate whether the link protocol is operational.
- **Loose-LMI**—Frame Relay does not use the Local Management Interface (LMI) to indicate whether the link protocol is operational.
- **Loose-NCP**—PPP does not use the Network Control Protocol (NCP) to indicate whether the device is operational.
- **No-Keepalives**—Link protocol keepalives are disabled.
- **PFC**—Protocol field compression is configured. The PPP session negotiates the PFC option.

---

#### Logical Interface Flags Field

The **Logical interface flags** field provides information about the logical interface and displays one or more of the following values:

- **ACFC Encapsulation**—Address control field Compression (ACFC) encapsulation is enabled (negotiated successfully with a peer).
- **Device-down**—Device has been administratively disabled.
- **Disabled**—Interface is administratively disabled.
- **Down**—A hardware failure has occurred.

- **Clear-DF-Bit**—GRE tunnel or IPsec tunnel is configured to clear the Don't Fragment (DF) bit.
- **Hardware-Down**—Interface protocol initialization failed to complete successfully.
- **PFC**—Protocol field compression is enabled for the PPP session.
- **Point-To-Point**—Interface is point-to-point.
- **SNMP-Traps**—SNMP trap notifications are enabled.
- **Up**—Interface is enabled and operational.

## Label-Switched Interface Traffic Statistics Field

When you use the **vrf-table-label** statement to configure a VRF routing table, a label-switched interface (LSI) logical interface label is created and mapped to the VRF routing table.

Any routes present in a VRF routing table and configured with the **vrf-table-label** statement are advertised with the LSI logical interface label allocated for the VRF routing table. When packets for this VPN arrive on a core-facing interface, they are treated as if the enclosed IP packet arrived on the LSI interface and are then forwarded and filtered based on the correct table. For more information on the **vrf-table-label** statement, including a list of supported interfaces, see the *Junos VPNs Configuration Guide*.

If you configure the **family mpls** statement at the **[edit interfaces interface-name unit logical-unit-number]** hierarchy level and you also configure the **vrf-table-label** statement at the **[edit routing-instances routing-instance-name]** hierarchy level, the output for the **show interface interface-name extensive** command includes the following output fields about the LSI traffic statistics:

- **Input bytes**—Number of bytes entering the LSI and the current throughput rate in bits per second (bps).
- **Input packets**—Number of packets entering the LSI and the current throughput rate in packets per second (pps).



**NOTE:** If LSI interfaces are used with VPLS when **no-tunnel-services** is configured or L3VPN when **vrf-table-label** configuration is applied inside the routing-instance, the **Input packets** field associated with the core-facing interfaces may not display the correct value. Only the Input counter is affected because the LSI is used to receive traffic from the remote PEs. Traffic that arrives on an LSI interface might not be counted at both the Traffic Statistics and the Label-switched interface (LSI) traffic statistics levels.

This note applies to the following platforms:

- M Series routers with -E3 FPC model numbers or configured with an Enhanced CFEB (CFEB-E), and M120 routers
- MX Series routers with DPC or ADPC only

The following example shows the LSI traffic statistics that you might see as part of the output of the **show interface *interface-name* extensive** command:

Label-switched interface (LSI) traffic statistics:

|                |   |       |
|----------------|---|-------|
| Input bytes:   | 0 | 0 bps |
| Input packets: | 0 | 0 pps |

## Policer Field

For the logical interface, the **Policer** field provides the policers that are to be evaluated when packets are received or transmitted on the interface. The format is **Policer: Input: *type-fpc/pic*port-in-policer, Output: *type-fpc/pic/port*-out-policer**. For example:

**Policer: Input: at-1/2/0-in-policer, Output: at-2/4/0-out-policer**

## Protocol Field

For the logical interface, the **Protocol** field indicates the protocol family or families that are configured on the interface, displaying one or more of the following values:

- **aenet**—Aggregated Ethernet. Displayed on Fast Ethernet interfaces that are part of an aggregated Ethernet bundle.
- **ccc**—Circuit cross-connect (CCC). Configured on the logical interface of CCC physical interfaces.
- **inet**—IP version 4 (IPv4). Configured on the logical interface for IPv4 protocol traffic, including Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), Internet Control Message Protocol (ICMP), and Internet Protocol Control Protocol (IPCP).
- **inet6**—IP version 6 (IPv6). Configured on the logical interface for IPv6 protocol traffic, including Routing Information Protocol for IPv6 (RIPng), Intermediate System-to-Intermediate System (IS-IS), and BGP.
- **iso**—International Organization for Standardization (ISO). Configured on the logical interface for IS-IS traffic.
- **mlfr-uni-nni**—Multilink Frame Relay (MLFR) FRF.16 user-to-network network-to-network (UNI NNI). Configured on the logical interface for link services bundling.
- **mlfr-end-to-end**—Multilink Frame Relay end-to-end. Configured on the logical interface for multilink bundling.
- **mlppp**—Multilink Point-to-Point Protocol (MLPPP). Configured on the logical interface for multilink bundling.
- **mpls**—Multiprotocol Label Switching (MPLS). Configured on the logical interface for participation in an MPLS path.
- **pppoe**—Point-to-Point Protocol over Ethernet (PPPoE). Configured on Ethernet interfaces enabled to support multiple protocol families.
- **tcc**—Translational cross-connect (TCC). Configured on the logical interface of TCC physical interfaces.

- **tnp**—Trivial Network Protocol (TNP). Used to communicate between the Routing Engine and the router's packet forwarding components. The Junos OS automatically configures this protocol family on the router's internal interfaces only.
- **vpls**—Virtual private LAN service (VPLS). Configured on the logical interface on which you configure VPLS.

## RPF Failures Field

For the logical interface, the **RPF Failures** field provides information about the amount of incoming traffic (in packets and bytes) that failed a unicast reverse path forwarding (RPF) check on a particular interface. The format is **RPF Failures: Packets: xx,Bytes: yy**. For example:

**RPF Failures: Packets: 0, Bytes:0**

## Source Class Field

For the logical interface, the **Source class** field provides the names of source class usage (SCU) counters per family and per class for a particular interface. The counters display packets and bytes arriving from designated user-selected prefixes. For example:

| Source class | Packets<br>(packet-per-second) | Bytes<br>(bits-per-second) |
|--------------|--------------------------------|----------------------------|
| gold         | 1928095                        | 161959980                  |
| (            | 889)                           | ( 597762)                  |
| bronze       | 0                              | 0                          |
| (            | 0)                             | ( 0)                       |
| silver       | 0                              | 0                          |
| (            | 0)                             | ( 0)                       |

## Improvements to Interface Transmit Statistics Reporting

The offered load on an interface can be defined as the amount of data the interface is capable of transmitting during a given time period. The actual traffic that goes out of the interface is the transmitted load. However, when outgoing interfaces are oversubscribed, there could be traffic drops in the schedulers attached to the outgoing interfaces. Hence, the offered load is not always the same as the actual transmitted load because the offered load calculation does not take into account possible packet drop or traffic loss.

On MX Series routers, the logical interface-level statistics show the offered load, which is often different from the actual transmitted load. To address this limitation, Junos OS introduces a new configuration option in Release 11.4 R3 and later. The new configuration option, **interface-transmit-statistics**, at the **[edit interface *interface-name*]** hierarchy level, enables you to configure Junos OS to accurately capture and report the transmitted load on interfaces.

When the **interface-transmit-statistics** statement is included at the **[edit interface *interface-name*]** hierarchy level, the following operational mode commands report the actual transmitted load:

- **show interface *interface-name* <detail | extensive>**

- `monitor interface interface-name`
- `show snmp mib get objectID.ifIndex`



**NOTE:** The `interface-transmit-statistics` statement is supported only on Enhanced Queuing Dense Port Concentrators (DPCs) (Bellini) and Enhanced IQ (IQE) (Agave) PICs of MX Series routers.

The `show interface interface-name` command also shows whether the `interface-transmit-statistics` configuration is enabled or disabled on the interface.

**Related  
Documentation**

- [interface-transmit-statistics on page 610](#)
- [show interfaces \(Gigabit Ethernet\) on page 1137](#)



## show interfaces (10-Gigabit Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>xe-fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Display status information about the specified 10-Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><i>xe-fpc/pic/port</i>—Display standard information about the specified 10-Gigabit Ethernet interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p>                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, IQ2) on page 982</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, WAN PHY Mode) on page 985</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, DWDM OTN PIC) on page 987</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode) on page 989</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Transmit-Only) on page 989</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Receive-Only) on page 990</a></p> |
| <b>Output Fields</b>            | See <a href="#">Table 46 on page 968</a> for the output fields for the <b>show interfaces</b> (10-Gigabit Ethernet) command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 46: show interfaces Gigabit Ethernet Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                               | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                                                                                                 |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                 | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                     | All levels                   |
| <b>Interface index</b>    | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                             | All levels                   |
| <b>MTU</b>                | Maximum transmission unit size on the physical interface.                                                                                                                                                                                       | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                        | All levels                   |
| <b>Loopback</b>           | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                                                                                                  | All levels                   |
| <b>Source filtering</b>   | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                    | All levels                   |
| <b>LAN-PHY mode</b>       | 10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.                                                   | All levels                   |
| <b>WAN-PHY mode</b>       | 10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.                       | All levels                   |
| <b>Unidirectional</b>     | Unidirectional link mode status for 10-Gigabit Ethernet interface: <b>Enabled</b> or <b>Disabled</b> for parent interface; <b>Rx-only</b> or <b>Tx-only</b> for child interfaces.                                                               | All levels                   |
| <b>Flow control</b>       | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                        | All levels                   |
| <b>Auto-negotiation</b>   | (Gigabit Ethernet interfaces) Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                       | All levels                   |
| <b>Remote-fault</b>       | (Gigabit Ethernet interfaces) Remote fault status: <ul style="list-style-type: none"> <li><b>Online</b>—Autonegotiation is manually configured as online.</li> <li><b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul> | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                       | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                          | All levels                   |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                           | Level of Output       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Link flags</b>               | Information about the link. Possible values are described in the “Links Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                              | All levels            |
| <b>Wavelength</b>               | (10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).                                                                                                                                      | All levels            |
| <b>Frequency</b>                | (10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).                                                                                                                                            | All levels            |
| <b>CoS queues</b>               | Number of CoS queues configured.                                                                                                                                                                                                                                            | detail extensive none |
| <b>Schedulers</b>               | (Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces only) Number of CoS schedulers configured.                                                                                                                                                                         | extensive             |
| <b>Hold-times</b>               | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                         | detail extensive      |
| <b>Current address</b>          | Configured MAC address.                                                                                                                                                                                                                                                     | detail extensive none |
| <b>Hardware address</b>         | Hardware MAC address.                                                                                                                                                                                                                                                       | detail extensive none |
| <b>Last flapped</b>             | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                        | detail extensive none |
| <b>Input Rate</b>               | Input rate in bits per second (bps) and packets per second (pps). The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level. | None specified        |
| <b>Output Rate</b>              | Output rate in bps and pps. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.                                        | None specified        |
| <b>Statistics last cleared</b>  | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                           | detail extensive      |
| <b>Egress account overhead</b>  | Layer 2 overhead in bytes that is accounted in the interface statistics for egress traffic.                                                                                                                                                                                 | detail extensive      |
| <b>Ingress account overhead</b> | Layer 2 overhead in bytes that is accounted in the interface statistics for ingress traffic.                                                                                                                                                                                | detail extensive      |

detail  
extensive

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface. The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p>Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes.</p> <p>For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see <a href="#">Table 46 on page 968</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Input errors</b>       | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored by configuring the <code>ignore-l3-incompletes</code> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b>           | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues</b>           | <p>Total number of egress queues supported on the specified interface.</p> <p><b>NOTE:</b> In DPCs that are not of the enhanced type, such as DPC 40x1GE R, DPCE 20x1GE + 2x10GE R, or DPCE 40x1GE R, you might notice a discrepancy in the output of the <b>show interfaces</b> command because incoming packets might be counted in the Egress queues section of the output. This problem occurs on non-enhanced DPCs because the egress queue statistics are polled from IMQ (Inbound Message Queuing) block of the I-chip. The IMQ block does not differentiate between ingress and egress WAN traffic; as a result, the combined statistics are displayed in the egress queue counters on the Routing Engine. In a simple VPLS scenario, if there is no MAC entry in DMAC table (by sending unidirectional traffic), traffic is flooded and the input traffic is accounted in IMQ. For bidirectional traffic (MAC entry in DMAC table), if the outgoing interface is on the same I-chip then both ingress and egress statistics are counted in a combined way. If the outgoing interface is on a different I-chip or FPC, then only egress statistics are accounted in IMQ. This behavior is expected with non-enhanced DPCs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Queue counters (Egress)</b> | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Ingress queues</b>                   | Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>             |
| <b>Queue counters (Ingress)</b>         | CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces. <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>             |
| <b>Active alarms and Active defects</b> | Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the routing device configuration, an alarm can ring the red or yellow alarm bell on the routing device, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b> . <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul> | <b>detail extensive none</b> |
| <b>OTN alarms</b>                       | Active OTN alarms identified on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b>      |
| <b>OTN defects</b>                      | OTN defects received on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>OTN FEC Mode</b>                     | The FECmode configured on the interface. <ul style="list-style-type: none"> <li>• <b>efec</b>—Enhanced forward error correction (EFEC) is configured to detect and correct bit errors.</li> <li>• <b>gfec</b>—G.709 Forward error correction (GFEC) mode is configured to detect and correct bit errors.</li> <li>• <b>none</b>—FEC mode is not configured.</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>OTN Rate</b>                         | OTN mode. <ul style="list-style-type: none"> <li>• <b>fixed-stuff-bytes</b>—Fixed stuff bytes 11.0957 Gbps.</li> <li>• <b>no-fixed-stuff-bytes</b>—No fixed stuff bytes 11.0491 Gbps.</li> <li>• <b>pass-through</b>—Enable OTN passthrough mode.</li> <li>• <b>no-pass-through</b>—Do not enable OTN passthrough mode.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>OTN Line Loopback</b>                | Status of the line loopback, if configured for the DWDM OTN PIC. Its value can be: <b>enabled</b> or <b>disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>OTN FEC statistics</b>               | The forward error correction (FEC) counters for the DWDM OTN PIC. <ul style="list-style-type: none"> <li>• <b>Corrected Errors</b>—The count of corrected errors in the last second.</li> <li>• <b>Corrected Error Ratio</b>—The corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits.</li> </ul>                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output         |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>OTN FEC alarms</b>   | OTN FEC excessive or degraded error alarms triggered on the interface. <ul style="list-style-type: none"> <li><b>FEC Degrade</b>—OTU FEC Degrade defect.</li> <li><b>FEC Excessive</b>—OTU FEC Excessive Error defect.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>OTN OC</b>           | OTN OC defects triggered on the interface. <ul style="list-style-type: none"> <li><b>LOS</b>—OC Loss of Signal defect.</li> <li><b>LOF</b>—OC Loss of Frame defect.</li> <li><b>LOM</b>—OC Loss of Multiframe defect.</li> <li><b>Wavelength Lock</b>—OC Wavelength Lock defect.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>OTN OTU</b>          | OTN OTU defects detected on the interface <ul style="list-style-type: none"> <li><b>AIS</b>—OTN AIS alarm.</li> <li><b>BDI</b>—OTN OTU BDI alarm.</li> <li><b>IAE</b>—OTN OTU IAE alarm.</li> <li><b>TTIM</b>—OTN OTU TTIM alarm.</li> <li><b>SF</b>—OTN ODU bit error rate fault alarm.</li> <li><b>SD</b>—OTN ODU bit error rate defect alarm.</li> <li><b>TCA-ES</b>—OTN ODU ES threshold alarm.</li> <li><b>TCA-SES</b>—OTN ODU SES threshold alarm.</li> <li><b>TCA-UAS</b>—OTN ODU UAS threshold alarm.</li> <li><b>TCA-BBE</b>—OTN ODU BBE threshold alarm.</li> <li><b>BIP</b>—OTN ODU BIP threshold alarm.</li> <li><b>BBE</b>—OTN OTU BBE threshold alarm.</li> <li><b>ES</b>—OTN OTU ES threshold alarm.</li> <li><b>SES</b>—OTN OTU SES threshold alarm.</li> <li><b>UAS</b>—OTN OTU UAS threshold alarm.</li> </ul> | <b>detail extensive</b> |
| <b>Received DAPI</b>    | Destination Access Port Interface (DAPI) from which the packets were received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Received SAPI</b>    | Source Access Port Interface (SAPI) from which the packets were received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| <b>Transmitted DAPI</b> | Destination Access Port Interface (DAPI) to which the packets were transmitted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b> |
| <b>Transmitted SAPI</b> | Source Access Port Interface (SAPI) to which the packets were transmitted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>PCS statistics</b>   | (10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device. <ul style="list-style-type: none"> <li><b>Bit errors</b>—The number of seconds during which at least one bit error rate (BER) occurred while the PCS receiver is operating in normal mode.</li> <li><b>Errored blocks</b>—The number of seconds when at least one errored block occurred while the PCS receiver is operating in normal mode.</li> </ul>                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output  |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>MAC statistics</b>                 | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> <li>• <b>Total octets and total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see <a href="#">Table 47 on page 982</a></li> <li>• <b>Unicast packets, Broadcast packets, and Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of frames that exceed 1518 octets.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul> | <b>extensive</b> |
| <b>OTN Received Overhead Bytes</b>    | APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b> |
| <b>OTN Transmitted Overhead Bytes</b> | APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b> |



Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Filter statistics | <p>Receive and Transmit statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> <li>• <b>Input packet count</b>—Number of packets received from the MAC hardware that the filter processed.</li> <li>• <b>Input packet rejects</b>—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address.</li> <li>• <b>Input DA rejects</b>—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the routing device from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local routing device (which the routing device is rejecting).</li> <li>• <b>Input SA rejects</b>—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect.</li> <li>• <b>Output packet count</b>—Number of packets that the filter has given to the MAC hardware.</li> <li>• <b>Output packet pad count</b>—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured.</li> <li>• <b>Output packet error count</b>—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment.</li> <li>• <b>CAM destination filters, CAM source filters</b>—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0.</li> </ul> | extensive       |
| PMA PHY           | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PHY Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | extensive       |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS section</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>WIS line</b>    | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output  |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS path</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information                 | <p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner:</b> <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is <b>None</b>. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> </ul> </li> <li>• <b>Local resolution</b>—Information from the link partner: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |
| Received path trace, Transmitted path trace | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the routing device at the other end of the fiber. The transmitted path trace value is the message that this routing device transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | extensive       |
| Packet Forwarding Engine configuration      | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>   | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>             | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>      | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> none |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                       |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>VLAN-Tag</b>                | <p>Rewrite profile applied to incoming or outgoing frames on the outer (<b>Out</b>) VLAN tag or for both the outer and inner (<b>In</b>) VLAN tags.</p> <ul style="list-style-type: none"> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>pop</b>—The outer VLAN tag of the incoming frame is removed.</li> <li>• <b>swap</b>—The outer VLAN tag of the incoming frame is overwritten with the user specified VLAN tag information.</li> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>push-push</b>—Two VLAN tags are pushed in from the incoming frame.</li> <li>• <b>swap-push</b>—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame.</li> <li>• <b>swap-swap</b>—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user specified VLAN tag value.</li> <li>• <b>pop-swap</b>—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.</li> <li>• <b>pop-pop</b>—Both the outer and inner VLAN tags of the incoming frame are removed.</li> </ul> | <b>brief detail extensive</b><br>none |
| <b>Demux:</b>                  | <p>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</p> <ul style="list-style-type: none"> <li>• Source Family Inet</li> <li>• Destination Family Inet</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> none          |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                            |
| <b>Protocol</b>                | Protocol family. Possible values are described in the “Protocol Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> none          |
| <b>MTU</b>                     | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> none          |
| <b>Maximum labels</b>          | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> none          |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface set. The value in this field also includes the Layer 2 overhead bytes for ingress or egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface set.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>               |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>                      |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to the routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>                      |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b>       | Number and rate of bytes and packets transiting the switch.<br><br><b>NOTE:</b> For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the <b>Output bytes</b> and <b>Output packets</b> interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler. | <b>extensive</b>             |
| <b>Generation</b>               | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Route Table</b>              | Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Flags</b>                    | Information about protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Donor interface</b>          | (Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Preferred source address</b> | (Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Input Filters</b>            | Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Output Filters</b>           | Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Mac-Validate Failures</b>    | Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>         | Information about the address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b>   | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>brief</b>                 |
| <b>Flags</b>                    | Information about address flag (possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Destination</b>              | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Local</b>                    | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Broadcast</b>                | Broadcast address of the logical interlace.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |

Table 46: show interfaces Gigabit Ethernet Output Fields (*continued*)

| Field Name | Field Description                                                 | Level of Output  |
|------------|-------------------------------------------------------------------|------------------|
| Generation | Unique number for use by Juniper Networks technical support only. | detail extensive |

For Gigabit Ethernet IQ PICs, traffic and MAC statistics output varies. [Table 47 on page 982](#) describes the traffic and MAC statistics for two sample interfaces, each of which is sending traffic in packets of 500 bytes (including 478 bytes for the Layer 3 packet, 18 bytes for the Layer 2 VLAN traffic header, and 4 bytes for cyclic redundancy check [CRC] information). In [Table 47 on page 982](#), the **ge-0/3/0** interface is the inbound physical interface, and the **ge-0/0/0** interface is the outbound physical interface. On both interfaces, traffic is carried on logical unit .50 (VLAN 50).

Table 47: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type

| Interface Type              | Sample Command                               | Byte and Octet Counts Include                                                                                                                                                                                 | Comments                                                                                                                                      |
|-----------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Inbound physical interface  | <b>show interfaces ge-0/3/0 extensive</b>    | Traffic statistics:<br><br>Input bytes: 496 bytes per packet, representing the Layer 2 packet<br><br>MAC statistics:<br><br>Received octets: 500 bytes per packet, representing the Layer 2 packet + 4 bytes  | The additional 4 bytes are for the CRC.                                                                                                       |
| Inbound logical interface   | <b>show interfaces ge-0/3/0.50 extensive</b> | Traffic statistics:<br><br>Input bytes: 478 bytes per packet, representing the Layer 3 packet                                                                                                                 |                                                                                                                                               |
| Outbound physical interface | <b>show interfaces ge-0/0/0 extensive</b>    | Traffic statistics:<br><br>Input bytes: 490 bytes per packet, representing the Layer 3 packet + 12 bytes<br><br>MAC statistics:<br><br>Received octets: 478 bytes per packet, representing the Layer 3 packet | For input bytes, the additional 12 bytes includes 6 bytes for the destination MAC address + 4 bytes for VLAN + 2 bytes for the Ethernet type. |
| Outbound logical interface  | <b>show interfaces ge-0/0/0.50 extensive</b> | Traffic statistics:<br><br>Input bytes: 478 bytes per packet, representing the Layer 3 packet                                                                                                                 |                                                                                                                                               |

## Sample Output

### show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, IQ2)

```

user@host> show interfaces xe-5/0/0 extensive
Physical interface: xe-5/0/0, Enabled, Physical link is Up
 Interface index: 177, SNMP ifIndex: 99, Generation: 178
 Link-level type: Ethernet, MTU: 1518, LAN-PHY mode, Speed: 10Gbps, Loopback:

```



```

None, Source filtering: Enabled,
Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 4 maximum usable queues
Schedulers : 1024
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:14:f6:b9:f1:f6, Hardware address: 00:14:f6:b9:f1:f6
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 6970332384 0 bps
 Output bytes : 0 0 bps
 Input packets: 81050506 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Ingress traffic statistics at Packet Forwarding Engine:
 Input bytes : 6970299398 0 bps
 Input packets: 81049992 0 pps
 Drop bytes : 0 0 bps
 Drop packets: 0 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0,
 MTU errors: 0, Resource errors: 0
Ingress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 81049992 81049992 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 0 0 0

Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 0 0 0

Active alarms : None
Active defects : None
PCS statistics
 Bit errors 0
 Errored blocks 0

```

```

MAC statistics:
Total octets 6970332384
Total packets 81050506
Unicast packets 81050000
Broadcast packets 506
Multicast packets 0
CRC/Align errors 0
FIFO errors 0
MAC control frames 0
MAC pause frames 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0

Filter statistics:
Input packet count 81050506
Input packet rejects 506
Input DA rejects 0
Input SA rejects 0
Output packet count 0
Output packet pad count 0
Output packet error count 0
CAM destination filters: 0, CAM source filters: 0

Packet Forwarding Engine configuration:
Destination slot: 5

CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 950000000 95 0 low none
3 network-control 5 50000000 5 0 low none

Direction : Input
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 950000000 95 0 low none
3 network-control 5 50000000 5 0 low none

Logical interface xe-5/0/0.0 (Index 71) (SNMP ifIndex 95) (Generation 195)
Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.100] Encapsulation: ENET2
Egress account overhead: 100
Ingress account overhead: 90

Traffic statistics:
Input bytes : 0
Output bytes : 46
Input packets: 0
Output packets: 1

IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Local statistics:
Input bytes : 0
Output bytes : 46
Input packets: 0
Output packets: 1

Transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input bytes : 0
Output bytes : 0

```

```

Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Protocol inet, MTU: 1500, Generation: 253, Route table: 0
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.1.1/24, Local: 192.1.1.1, Broadcast: 192.1.1.255,
Generation: 265
Protocol multiservice, MTU: Unlimited, Generation: 254, Route table: 0
 Flags: None
 Policer: Input: __default_arp_policer__

```

### show interfaces extensive (10-Gigabit Ethernet, WAN PHY Mode)

```

user@host> show interfaces xe-1/0/0 extensive
Physical interface: xe-1/0/0, Enabled, Physical link is Up
Interface index: 141, SNMP ifIndex: 34, Generation: 47
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Loopback: Disabled
WAN-PHY mode
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps 16384
Link flags : None
CoS queues : 4 supported
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:a2:10:9d, Hardware address: 00:05:85:a2:10:9d
Last flapped : 2005-07-07 11:22:34 PDT (3d 12:28 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 HS Link CRC errors: 0, HS Link FIFO overflows: 0,
 Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0,
 Aged packets: 0, FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0,
 Resource errors: 0
Queue counters:
 Queued packets Transmitted packets Dropped packets
0 best-effort 0 0 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 0 0 0
Active alarms : LOL, LOS, LBL
Active defects: LOL, LOS, LBL, SEF, AIS-L, AIS-P
PCS statistics
 Seconds Count
Bit errors 0 0
Errored blocks 0 0
MAC statistics:
 Receive Transmit
Total octets 0 0
Total packets 0 0
Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0

```

```

CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
PMA PHY:
 Seconds Count State
 PLL lock 0 0 OK
 PHY light 63159 1 Light Missing
WIS section:
 BIP-B1 0 0
 SEF 434430 434438 Defect Active
 LOS 434430 1 Defect Active
 LOF 434430 1 Defect Active
 ES-S 434430
 SES-S 434430
 SEFS-S 434430
WIS line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 434430 1 Defect Active
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 ES-L 434430
 SES-L 434430
 UAS-L 434420
 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
WIS path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 434430 1 Defect Active
 RDI-P 0 0 OK
 UNEQ-P 0 0 OK
 PLM-P 0 0 OK
 ES-P 434430
 SES-P 434430
 UAS-P 434420
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Received path trace:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted path trace: orissa so-1/0/0
6f 72 69 73 73 61 20 73 6f 2d 31 2f 30 2f 30 00 orissa so-1/0/0.
Packet Forwarding Engine configuration:

```

```

Destination slot: 1
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % bytes
0 best-effort 95 950000000 95 0 low none
3 network-control 5 50000000 5 0 low none

```

### show interfaces extensive (10-Gigabit Ethernet, DWDM OTN PIC)

```

user@host> show interfaces ge-7/0/0 extensive
Physical interface: ge-7/0/0, Enabled, Physical link is Down
Interface index: 143, SNMP ifIndex: 508, Generation: 208
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Enabled
Device flags : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
Link flags : None
Wavelength : 1550.12 nm, Frequency: 193.40 THz
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:70:2b:72, Hardware address: 00:05:85:70:2b:72
Last flapped : 2011-04-20 15:48:54 PDT (18:39:49 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 2, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 0 0 0

1 expedited-fo 0 0 0

2 assured-forw 0 0 0

3 network-cont
Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control
Active alarms : LINK
Active defects : LINK
MAC statistics:
Total octets Receive Transmit
Total packets 0 0

```

```

Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Total octets 0 0
Total packets 0 0
Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
OTN alarms : None
OTN defects : None
OTN FEC Mode : GFEC
OTN Rate : Fixed Stuff Bytes 11.0957Gbps
OTN Line Loopback : Enabled
OTN FEC statistics :
 Corrected Errors 0
 Corrected Error Ratio (0 sec average) 0e-0
OTN FEC alarms: Seconds Count State
 FEC Degrade 0 0 OK
 FEC Excessive 0 0 OK
OTN OC: Seconds Count State
 LOS 2 1 OK
 LOF 67164 2 Defect Active
 LOM 67164 71 Defect Active
 Wavelength Lock 0 0 OK
OTN OTU:
 AIS 0 0 OK
 BDI 65919 4814 Defect Active
 IAE 67158 1 Defect Active
 TTIM 7 1 OK
 SF 67164 2 Defect Active
 SD 67164 3 Defect Active
 TCA-ES 0 0 OK
 TCA-SES 0 0 OK
 TCA-UAS 80 40 OK
 TCA-BBE 0 0 OK
 BIP 0 0 OK
 BBE 0 0 OK
 ES 0 0 OK
 SES 0 0 OK
 UAS 587 0 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:

```

```

00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN Received Overhead Bytes:
 APS/PCC0: 0x02, APS/PCC1: 0x42, APS/PCC2: 0xa2, APS/PCC3: 0x48
 Payload Type: 0x03
OTN Transmitted Overhead Bytes:
 APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
 Payload Type: 0x03
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 7
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec
0 best-effort 95 9500000000 95 0 low
none
3 network-control 5 500000000 5 0 low
none
...

```

#### show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode)

```

user@host> show interfaces xe-7/0/0 extensive
Physical interface: xe-7/0/0, Enabled, Physical link is Up
 Interface index: 173, SNMP ifIndex: 212, Generation: 174
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
 Unidirectional: Enabled,
 Loopback: None, Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
...

```

#### show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Transmit-Only)

```

user@host> show interfaces xe-7/0/0-tx extensive
Physical interface: xe-7/0/0-tx, Enabled, Physical link is Up
 Interface index: 176, SNMP ifIndex: 137, Generation: 177
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
 Unidirectional: Tx-Only
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:73:e4:83, Hardware address: 00:05:85:73:e4:83
 Last flapped : 2007-06-01 09:08:19 PDT (3d 02:31 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps

```

```

Output bytes : 322891152287160 9627472888 bps
Input packets: 0 0 pps
Output packets: 328809727380 1225492 pps

...

Filter statistics:
 Output packet count 328810554250
 Output packet pad count 0
 Output packet error count 0
...

Logical interface xe-7/0/0-tx.0 (Index 73) (SNMP ifIndex 138) (Generation 139)

Flags: SNMP-Traps Encapsulation: ENET2
Egress account overhead: 100
Ingress account overhead: 90
Traffic statistics:
 Input bytes : 0
 Output bytes : 322891152287160
 Input packets: 0
 Output packets: 328809727380
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 322891152287160 9627472888 bps
 Input packets: 0 0 pps
 Output packets: 328809727380 1225492 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Protocol inet, MTU: 1500, Generation: 147, Route table: 0
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.11.12/24, Local: 10.11.12.13, Broadcast: 10.11.12.255,
Generation: 141
 Protocol multiservice, MTU: Unlimited, Generation: 148, Route table: 0
 Flags: None
 Policer: Input: __default_arp_policer__

```

#### show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Receive-Only)

```

user@host> show interfaces xe-7/0/0-rx extensive
Physical interface: xe-7/0/0-rx, Enabled, Physical link is Up
 Interface index: 174, SNMP ifIndex: 118, Generation: 175
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
Unidirectional: Rx-Only
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues

```



```

Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:73:e4:83, Hardware address: 00:05:85:73:e4:83
Last flapped : 2007-06-01 09:08:22 PDT (3d 02:31 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 322857456303482 9627496104 bps
 Output bytes : 0 0 bps
 Input packets: 328775413751 1225495 pps
 Output packets: 0 0 pps

...

Filter statistics:
 Input packet count 328775015056
 Input packet rejects 1
 Input DA rejects 0

...

Logical interface xe-7/0/0-rx.0 (Index 72) (SNMP ifIndex 120) (Generation 138)

Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
 Input bytes : 322857456303482
 Output bytes : 0
 Input packets: 328775413751
 Output packets: 0
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 322857456303482 9627496104 bps
 Output bytes : 0 0 bps
 Input packets: 328775413751 1225495 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Protocol inet, MTU: 1500, Generation: 145, Route table: 0
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.1.1/24, Local: 192.1.1.1, Broadcast: 192.1.1.255,
Generation: 139
 Protocol multiservice, MTU: Unlimited, Generation: 146, Route table: 0
 Flags: None
 Policer: Input: __default_arp_policer__

```

## show interfaces (ATM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces at-<i>fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified ATM interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><b>at-<i>fpc/pic/port</i></b>—Display standard information about the specified ATM interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display the SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (ATM, IMA Group) on page 1007</a></p> <p><a href="#">show interfaces extensive (ATM IMA Group) on page 1008</a></p> <p><a href="#">show interfaces (ATM1, SONET Mode) on page 1009</a></p> <p><a href="#">show interfaces brief (ATM1, SONET Mode) on page 1010</a></p> <p><a href="#">show interfaces detail (ATM1, SONET Mode) on page 1010</a></p> <p><a href="#">show interfaces extensive (ATM1, SONET Mode) on page 1011</a></p> <p><a href="#">show interfaces (ATM2, SDH Mode) on page 1013</a></p> <p><a href="#">show interfaces brief (ATM2, SDH Mode) on page 1014</a></p> <p><a href="#">show interfaces detail (ATM2, SDH Mode) on page 1015</a></p> <p><a href="#">show interfaces extensive (ATM2, SDH Mode) on page 1016</a></p> <p><a href="#">show interfaces (ATM2, SONET Mode) on page 1019</a></p> <p><a href="#">show interfaces brief (ATM2, SONET Mode) on page 1020</a></p> <p><a href="#">show interfaces detail (ATM2, SONET Mode) on page 1021</a></p> <p><a href="#">show interfaces extensive (ATM2, SONET Mode) on page 1023</a></p> |
| <b>Output Fields</b>            | <p><a href="#">Table 48 on page 992</a> lists the output fields for the <b>show interfaces (ATM)</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 48: ATM show interfaces Output Fields

| Field Name         | Field Description | Level of Output |
|--------------------|-------------------|-----------------|
| Physical Interface |                   |                 |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Description</b>        | Configured interface description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface: <ul style="list-style-type: none"> <li>• <b>ATM-CCC-CELL-RELAY</b>—ATM cell relay for CCC.</li> <li>• <b>ATM-CCC-VC-MUX</b>—ATM virtual circuit (VC) for CCC.</li> <li>• <b>ATM-CISCO-NLPID</b>—Cisco-compatible ATM NLPID encapsulation.</li> <li>• <b>ATM-MIPP-LLC</b>—ATM MLPPP over ATM Adaptation Layer 5 (AAL5)/logical link control (LLC).</li> <li>• <b>ATM-NLPID</b>—ATM NLPID encapsulation.</li> <li>• <b>ATM-PPP-LLC</b>—ATM PPP over AAL5/LLC.</li> <li>• <b>ATM-PPP-VC-MUX</b>—ATM PPP over raw AAL5.</li> <li>• <b>ATM-PVC</b>—ATM permanent virtual circuits.</li> <li>• <b>ATM-SNAP</b>—ATM LLC/SNAP encapsulation.</li> <li>• <b>ATM-TCC-SNAP</b>—ATM LLC/SNAP for translational cross-connection.</li> <li>• <b>ATM-TCC-VC-MUX</b>—ATM VC for translational cross-connection.</li> <li>• <b>ATM-VC-MUX</b>—ATM VC multiplexing.</li> <li>• <b>ETHER-OVER-ATM-LLC</b>—Ethernet over ATM (LLC/SNAP) encapsulation.</li> <li>• <b>ETHER-VPLS-OVER-ATM-LLC</b>—Ethernet VPLS over ATM (bridging) encapsulation.</li> </ul> | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Clocking</b>           | Reference clock source: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>framing Mode</b>       | Framing mode: <b>SONET</b> or <b>SDH</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running as represented by the interface type (for example, <b>OC3</b> , <b>ADSL2+</b> , and <b>SHDSL(2-wire)</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Payload scrambler</b>  | Whether payload scrambling is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link flags</b>              | Information about the link. Possible values are described in the “Link Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Current address</b>         | Ethernet MAC address for this interface for Ethernet over ATM encapsulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Input Rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | None specified               |
| <b>Output Rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | Statistics for traffic on the interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Input errors</b>            | Input errors on the interface whose definitions are as follows: <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and frame check sequence (FCS) errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's random early detection (RED) mechanism.</li> <li>• <b>Invalid VCs</b>—Number of cells that arrived for a nonexistent VC.</li> <li>• <b>Framing errors</b>—Sum of AAL5 packets that have FCS errors, reassembly timeout errors, and length errors.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output              |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                        | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If it increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained so long in shared packet SDRAM that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets larger than the MTU threshold.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Egress queues</b>                        | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>Queue counters</b>                       | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Physical interface queue counters of ATM2 PICs displayed by the <b>show interfaces at-fpc/pic/port detail</b> command show the packet forwarding stream statistics associated with the ATM2 ports. Since multiple ports of the ATM2 PICs (except for the ATM2 dual-port OC12) share one packet forwarding stream, the physical interface queue counters reflect the aggregate of ATM2 port statistics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>SONET alarms</b><br><b>SONET defects</b> | <p>SONET media-specific defects that prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SONET PHY</b>, <b>SONET section</b>, <b>SONET line</b>, and <b>SONET path</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET PHY</b>     | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>SONET section</b> | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b> |
| <b>SONET line</b>    | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault signal failure</li> <li>• <b>BERR-SD</b>—Bit error rate defect signal degradation</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET path</b>                 | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>ES-PFE</b>—Errored seconds (far-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |
| <b>Received SONET overhead</b>    | Values of the received and transmitted SONET overhead:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |
| <b>Transmitted SONET overhead</b> | <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1 and K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3 and Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| <b>SDH alarms</b>                 | SDH media-specific defects that can prevent the interface from passing packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels       |
| <b>SDH defects</b>                | When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SDH PHY</b> , <b>SDH regenerator section</b> , <b>SDH multiplex section</b> , and <b>SDH path</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH PHY</b>                 | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |
| <b>SDH regenerator section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>RS-BIP8</b>—24-bit BIP for multiplex section overhead (B2 bytes)</li> <li>• <b>OOF</b>—Out of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>RS-ES</b>—Errored seconds (near-end regenerator section)</li> <li>• <b>RS-SES</b>—Severely errored seconds (near-end regenerator section)</li> <li>• <b>RS-SEFS</b>—Severely errored framing seconds (regenerator section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| <b>SDH multiplex section</b>   | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>MS-BIP24</b>—8-bit BIP for high-order path overhead (B3 byte)</li> <li>• <b>MS-FEBE</b>—Far-end block error (multiplex section)</li> <li>• <b>MS-FERF</b>—Far-end remote fail (multiplex section)</li> <li>• <b>MS-AIS</b>—Alarm indication signal (multiplex section)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>MS-ES</b>—Errored seconds (near-end multiplex section)</li> <li>• <b>MS-SES</b>—Severely errored seconds (near-end multiplex section)</li> <li>• <b>MS-UAS</b>—Unavailable seconds (near-end multiplex section)</li> <li>• <b>MS-ES-FE</b>—Errored seconds (far-end multiplex section)</li> <li>• <b>MS-SES-FE</b>—Severely errored seconds (far-end multiplex section)</li> <li>• <b>MS-UAS-FE</b>—Unavailable seconds (far-end multiplex section)</li> </ul> | <b>extensive</b> |



Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                                                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH path</b>                                                     | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>HP-BIP8</b>—8-bit BIP for regenerator section overhead (B1 byte)</li> <li>• <b>HP-FEBE</b>—Far-end block error (high-order path)</li> <li>• <b>HP-LOP</b>—Loss of pointer (high-order path)</li> <li>• <b>HP-AIS</b>—High-order-path alarm indication signal</li> <li>• <b>HP-FERF</b>—Far-end remote fail (high-order path)</li> <li>• <b>HP-UNEQ</b>—Unequipped (high-order path)</li> <li>• <b>HP-PLM</b>—Payload label mismatch (high-order path)</li> <li>• <b>HP-ES</b>—Errored seconds (near-end high-order path)</li> <li>• <b>HP-SES</b>—Severely errored seconds (near-end high-order path)</li> <li>• <b>HP-UAS</b>—Unavailable seconds (near-end high-order path)</li> <li>• <b>HP-ES-FE</b>—Errored seconds (far-end high-order path)</li> <li>• <b>HP-SES-FE</b>—Severely errored seconds (far-end high-order path)</li> <li>• <b>HP-UAS-FE</b>—Unavailable seconds (far-end high-order path)</li> </ul> | <b>extensive</b> |
| <b>Received SDH overhead</b><br><br><b>Transmitted SDH overhead</b> | <p>Values of the received and transmitted SONET overhead:</p> <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. This byte is allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. This byte is used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3</b> and <b>Z4</b>—These bytes are allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b> |
| <b>Received path trace</b><br><br><b>Transmitted path trace</b>     | <p>SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>ATM Status</b> | ATM state information: <ul style="list-style-type: none"><li>• <b>HCS State</b>—Status of the header check sequence. ATM uses the HCS field in the cell header in the cell delineation process to frame ATM cell boundaries. The HCS is an FCS-8 calculation over the first four octets of the ATM cell header.</li><li>• <b>LOC</b>—Current loss of cell (LOC) delineation state. <b>OK</b> means that no LOC is currently asserted.</li></ul> | <b>extensive</b> |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| ATM Statistics                         | <p>ATM statistics for the interface:</p> <ul style="list-style-type: none"> <li>• <b>Uncorrectable HCS errors</b>—Number of cells dropped because the cell delineation failed. These errors most likely indicate that a SONET/SDH layer problem has occurred.</li> <li>• <b>Correctable HCS errors</b>—Number of correctable HCS errors that occurred. The cell delineation process can recover from these errors and locate the ATM cell boundary, although the framing process is not quite stable. The ATM cell is not dropped. This counter increases when the cell delineation process changes its state from <b>present</b> to <b>sync</b> (for example, when a cable is plugged into the interface).</li> </ul> <p>The following error statistics are from the framer:</p> <ul style="list-style-type: none"> <li>• <b>Tx cell FIFO overruns</b>—Number of overruns in the transmit FIFO.</li> <li>• <b>Rx cell FIFO overruns</b>—Number of overruns in the receive FIFO.</li> <li>• <b>Rx cell FIFO underruns</b>—Number of underruns in the receive FIFO.</li> <li>• <b>Input cell count</b>—Number of ATM cells received by the interface (not including idle cells).</li> <li>• <b>Output cell count</b>—Number of ATM cells transmitted by the interface (including idle cells).</li> <li>• <b>Output idle cell count</b>—Number of idle cells sent by the port. When ATM has nothing to send, it sends idle cells to fill the time slot.</li> <li>• <b>Output VC queue drops</b>—Number of packets dropped by a port on the PIC. Packets are dropped because of queue limits on the VCs.</li> </ul> <p>The following error statistics are from the SAR:</p> <ul style="list-style-type: none"> <li>• <b>Input no buffers</b>—Number of AAL5 packets dropped because no channel blocks or buffers were available to handle them.</li> <li>• <b>Input length errors</b>—Number of AAL5 packets dropped because their length was incorrect. Usually, these errors occur because a cell has been corrupted or lost, or because the length field was corrupted. They can also mean the AAL5 length field was zero.</li> <li>• <b>Input timeouts</b>—Number of AAL5 packets dropped because of a reassembly timeout.</li> <li>• <b>Input invalid VCs</b>—Number of AAL5 packets dropped because the header was unrecognized (because the VC was not correct or not configured).</li> <li>• <b>Input bad CRCs</b>—Number of AAL5 packets dropped because of frame check sequence errors.</li> <li>• <b>Input OAM cell no buffers</b>—Number of received OAM cells or raw cells dropped because no buffers were available to handle them.</li> <li>• <b>L2 circuit out-of-sequence packets</b>—(Layer 2 AAL5 mode) Number of AAL5 packets that are out of sequential order.</li> <li>• <b>Denied packets count</b>—The number of packets dropped due to VLAN priority deny packets or due to an error forwarding configuration that might cause a negative frame length, that is, the stripping size is larger than the packet size.</li> </ul> | extensive       |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CoS information | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"><li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li><li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li><li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li><li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li><li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li><li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li><li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li></ul> | extensive       |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| VPI                      | <p>(ATM2) Virtual path identifier information:</p> <ul style="list-style-type: none"> <li>• <b>Flags</b>—VPI flags can be one or more of the following: <ul style="list-style-type: none"> <li>• <b>Active</b> (virtual path is up)</li> <li>• <b>OAM</b> (operation and maintenance is enabled)</li> <li>• <b>Shaping</b> (shaping is configured)</li> </ul> </li> <li>• <b>CBR, Peak</b></li> <li>• <b>OAM, Period</b>—Interval at which OAM F4 loopback cells are sent.</li> <li>• <b>Up count</b>—Number of F4 OAM cells required to consider the virtual path up; the range is 1 through 255.</li> <li>• <b>Down count</b>—Number of F4 OAM cells required to consider the virtual path down; the range is 1 through 255.</li> <li>• <b>Total down time</b>—Total number of seconds the VPI has been down since it was opened, using the format <b>Total down time: hh:mm:ss</b> or <b>Never</b>.</li> <li>• <b>Last down</b>—Time of last <b>Down</b> transition, using the format <b>Last down: hh:mm:ss ago</b> or <b>Never</b>.</li> <li>• <b>OAM F4 cell statistics</b>—(Nonpromiscuous mode) OAM F4 statistics: <ul style="list-style-type: none"> <li>• <b>Total received</b>—Number of OAM F4 cells received.</li> <li>• <b>Total sent</b>—Number of OAM F4 cells sent.</li> <li>• <b>Loopback received</b>—Number of OAM F4 loopback cells received.</li> <li>• <b>Loopback sent</b>—Number of OAM F4 loopback cells sent.</li> <li>• <b>Last received</b>—Time at which the last OAM F4 cell was received.</li> <li>• <b>Last sent</b>—Time at which the last OAM F4 cell was sent.</li> <li>• <b>RDI received</b>—Number of OAM F4 cells received with the remote defect indication bit set.</li> <li>• <b>RDI sent</b>—Number of OAM F4 cells sent with the RDI bit set.</li> <li>• <b>AIS received</b>—Number of OAM F4 cells received with the alarm indication signal bit set.</li> <li>• <b>AIS sent</b>—Number of OAM F4 cells sent with the AIS bit set.</li> </ul> </li> </ul> <p><b>Traffic statistics:</b></p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the VPI.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the VPI.</li> <li>• <b>Input packets</b>—Number of packets received on the VPI.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the VPI.</li> </ul> | detail extensive none |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| Logical interface        | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels            |
| Index                    | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | detail extensive none |
| SNMP ifIndex             | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive none |
| Generation               | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive      |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Flags</b>                  | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                         | All levels                   |
| <b>Input packets</b>          | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                           | None specified               |
| <b>Output packets</b>         | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                        | None specified               |
| <b>Encapsulation</b>          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Traffic statistics</b>     | Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize. | <b>detail extensive</b>      |
| <b>Local statistics</b>       | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                            | <b>detail extensive</b>      |
| <b>Transit statistics</b>     | Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                                                          | <b>detail extensive</b>      |
| <b>Input packets</b>          | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                           | None specified               |
| <b>Output packets</b>         | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                        | None specified               |
| <b><i>protocol-family</i></b> | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                       | <b>brief</b>                 |
| <b>Protocol</b>               | Protocol family configured on the logical interface.                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>MTU</b>                    | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Generation</b>             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Route table</b>            | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Flags</b>                  | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>       | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Destination</b>            | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Local</b>      | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Broadcast</b>  | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b> | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>VCI</b>        | Virtual circuit identifier number and information: <ul style="list-style-type: none"> <li>• <b>Flags</b>—VCI flags:               <ul style="list-style-type: none"> <li>• <b>Active</b>—VCI is up and in working condition.</li> <li>• <b>CCC down</b>—VCI CCC is not in working condition.</li> <li>• <b>Closed</b>—VCI is closed because the user disabled the logical or physical interface from the CLI.</li> <li>• <b>Configured</b>—VCI is configured.</li> <li>• <b>Down</b>—VCI is not in working condition. The VCI might have alarms, defects, F5 AIS/RDI, or no response to OAM loopback cells.</li> <li>• <b>ILMI</b>—VCI is up and in working condition.</li> <li>• <b>OAM</b>—OAM loopback is enabled.</li> <li>• <b>Multicast</b>—VCI is a multicast VCI or DLCI.</li> <li>• <b>Multipoint destination</b>—VCI is configured as a multipoint destination.</li> <li>• <b>None</b>—No VCI flags.</li> <li>• <b>Passive-OAM</b>—Passive OAM is enabled.</li> <li>• <b>Shaping</b>—Shaping is enabled.</li> <li>• <b>Sustained</b>—Shaping rate is set to <b>Sustained</b>.</li> <li>• <b>Unconfigured</b>—VCI is not configured.</li> </ul> </li> <li>• <b>Total down time</b>—Total number of seconds the VCI has been down, using the format <b>Total down time: hh:mm:ss</b> or <b>Never</b>.</li> <li>• <b>Last down</b>—Time of last <b>Down</b> transition, using the format <b>Last down: hh:mm:ss</b>.</li> <li>• <b>EPD threshold</b>—(ATM2 only) Threshold at which a packet is dropped when the queue size (in number of cells) exceeds the early packet-discard (EPD) value.</li> </ul> | All levels                   |

Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output       |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| VCI (continued)      | <ul style="list-style-type: none"> <li>• <b>Transmit weight cells</b>—(ATM2 only) Amount of bandwidth assigned to this queue.</li> <li>• <b>ATM per-VC transmit statistics:</b> <ul style="list-style-type: none"> <li>• <b>Tail queue packet drops</b>—Number of packets dropped because of bandwidth constraints. This value indicates that packets are queued to send out at a rate faster than allowed.</li> </ul> </li> <li>• <b>OAM F4 cell statistics</b>—(Nonpromiscuous mode) OAM F4 statistics: <ul style="list-style-type: none"> <li>• <b>Total received</b>—Number of OAM F4 cells received.</li> <li>• <b>Total sent</b>—Number of OAM F4 cells sent.</li> <li>• <b>Loopback received</b>—Number of OAM F4 loopback cells received.</li> <li>• <b>Loopback sent</b>—Number of OAM F4 loopback cells sent.</li> <li>• <b>Last received</b>—Time at which the last OAM F4 cell was received.</li> <li>• <b>Last sent</b>—Time at which the last OAM F4 cell was sent.</li> <li>• <b>RDI received</b>—Number of OAM F4 cells received with the remote defect indication bit set.</li> <li>• <b>RDI sent</b>—Number of OAM F4 cells sent with the RDI bit set.</li> <li>• <b>AIS received</b>—Number of OAM F4 cells received with the alarm indication signal bit set.</li> <li>• <b>AIS sent</b>—Number of OAM F4 cells sent with the AIS bit set.</li> </ul> </li> <li>• <b>Traffic statistics</b>—Number and rate of bytes and packets received and transmitted on the physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> </li> </ul> | All levels            |
| IMA group properties | <ul style="list-style-type: none"> <li>• <b>Version</b>—The specified IMA specification version, either IMA 1.0 or IMA 1.1.</li> <li>• <b>Frame length</b>—The specified frame size, which can be 32, 64, 128, or 256.</li> <li>• <b>Differential delay</b>—Maximum differential delay among links in milliseconds.</li> <li>• <b>Symmetry</b>—Either Common Transmit Clock or Independent Transmit Clock timing mode.</li> <li>• <b>Transmit clock</b>—The specified IMA clock mode, either common or independent.</li> <li>• <b>Minimum links</b>—The number of minimum active links specified in both transmit and receive directions. <ul style="list-style-type: none"> <li>• <b>Transmit</b>—The per-PIC limit on the number of minimum active links in the transmit direction.</li> <li>• <b>Receive</b>—The per-PIC limit on the number of minimum active links in the receive direction.</li> </ul> </li> <li>• <b>Frame synchronization</b>—The specified IMA frame synchronization state transition variables (Alpha, Beta, and Gamma) and their specified values. <ul style="list-style-type: none"> <li>• <b>Alpha</b>—The number of consecutive invalid ICP cells for IFSM.</li> <li>• <b>Beta</b>—The number of consecutive errored ICP cells for IFSM.</li> <li>• <b>Gamma</b>—The number of consecutive valid ICP cells for IFSM.</li> </ul> </li> <li>• <b>Links</b>—The number of IMA links assigned to the IMA group.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive none |



Table 48: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output       |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IMA group alarms  | <ul style="list-style-type: none"> <li>• <b>Start-up-FE</b>—Far-end group alarm status</li> <li>• <b>Config-Aborted</b>—Near-end configuration aborted group alarm status</li> <li>• <b>Config-Aborted-FE</b>—Far-end configuration aborted group alarm status</li> <li>• <b>Insufficient-Links</b>—Near-end insufficient links group alarm status</li> <li>• <b>Insufficient-Links-FE</b>—Far-end insufficient links group alarm status</li> <li>• <b>Blocked-FE</b>—Far-end blocked group alarm status</li> <li>• <b>GR-Timing-Mismatch</b>—Group timing mismatch alarm status</li> </ul>        | detail extensive none |
| IMA group defects | <ul style="list-style-type: none"> <li>• <b>Start-up-FE</b>—Far-end group defect status</li> <li>• <b>Config-Aborted</b>—Near-end configuration aborted group defect status</li> <li>• <b>Config-Aborted-FE</b>—Far-end configuration aborted group defect status</li> <li>• <b>Insufficient-Links</b>—Near-end insufficient links group defect status</li> <li>• <b>Insufficient-Links-FE</b>—Far-end insufficient links group defect status</li> <li>• <b>Blocked-FE</b>—Far-end blocked group defect status</li> <li>• <b>GR-Timing-Mismatch</b>—Group timing mismatch defect status</li> </ul> | detail extensive none |
| IMA Group state   | Near-end and far-end group status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive none |
| IMA group media   | <p>IMA group media status, including seconds, count and state for the following media parameters:</p> <ul style="list-style-type: none"> <li>• FC</li> <li>• FC-FE</li> <li>• Addr-Mismatch</li> <li>• Running</li> <li>• UAS</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | detail extensive none |

## Sample Output

### show interfaces (ATM, IMA Group)

```

user@host> show interfaces at-1/0/0
Physical interface: at-1/0/0, Enabled, Physical link is Up
 IMA group properties:
 Version : 1.1
 Frame length : 128
 Differential delay : 25 milliseconds
 Symmetry : Symmetrical Configuration and Operation
 Transmit clock : Common
 Minimum links : Transmit: 1, Receive: 1
 Frame synchronization: Alpha: 2, Beta: 2, Gamma: 1
 Links : None
 IMA group alarms : Start-up-FE Config-Aborted Config-Aborted-FE
 Insufficient-Links Insufficient-Links-FE Blocked-FE GR-Timing-Mismatch
 IMA group defects : Start-up-FE Config-Aborted Config-Aborted-FE
 Insufficient-Links Insufficient-Links-FE Blocked-FE GR-Timing-Mismatch
 IMA Group state:
 Near end : Start up
 Far end : Start up
 IMA group media: Seconds Count State

```

```

FC 0
FC-FE 0
Addr-Mismatch 0
Running 0
UAS 0

```

### show interfaces extensive (ATM IMA Group)

```

user@host> show interfaces at-0/0/10 extensive
Physical interface: at-0/0/10, Enabled, Physical link is Up
 Interface index: 178, SNMP ifIndex: 540, Generation: 531
 Link-level type: ATM-PVC, MTU: 2048, Speed: Unspecified, Loopback: None, Payload
scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 8 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 84:18:88:c0:33:0a
 Last flapped : 2012-03-16 16:49:15 PDT (2d 07:12 ago)
 Statistics last cleared: 2012-03-16 16:56:58 PDT (2d 07:05 ago)
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards:
0, L3 incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors:
0, Resource errors: 0
 IMA group properties:
 Version : 1.1
 Frame length : 128
 Differential delay : 25 milliseconds
 Symmetry : Symmetrical Configuration and Operation
 Transmit clock : Common
 Minimum links : Transmit: 1, Receive: 1
 Frame synchronization: Alpha: 2, Beta: 2, Gamma: 1
 Link #1 : t1-0/0/4 up
 IMA Group alarms : None
 IMA Group defects : None

 IMA Group state:
 Near end : Operational
 Far end : Operational
 IMA group media:
 Seconds Count State
 FC 0
 FC-FE 0
 Addr-Mismatch 0
 Running 198306
 UAS 0
 ATM status:
 HCS state: Sync
 LOC : OK

```

```

ATM Statistics:
 Uncorrectable HCS errors: 0, Correctable HCS errors: 0, Tx cell FIFO overruns:
0, Rx cell FIFO overruns: 0,
 Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0, Output
idle cell count: 0,
 Output VC queue drops: 0, Input no buffers: 0, Input length errors: 0, Input
timeouts: 0, Input invalid VCs: 0,
 Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
 Destination slot: 0
 VPI 2
 Flags: Active
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets : 0

Logical interface at-0/0/10.602 (Index 71) (SNMP ifIndex 1057) (Generation
17226)
 Flags: Point-To-Point SNMP-Traps CCC-Down 0x0 Encapsulation:
ATM-CCC-Cell-Relay
 L2 circuit cell bundle size: 1, bundle timeout: 125 usec, timeout count: 0
 L2 circuit out-of-sequence count: 0, denied packets count: 0

```

#### show interfaces (ATM1, SONET Mode)

```

user@host> show interfaces at-1/0/0
Physical interface: at-1/0/0, Enabled, Physical link is Up
 Interface index: 300, SNMP ifIndex: 194
 Description: to allspice at-1/0/0
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Current address: 00:05:85:02:38:7e
 Last flapped : 2006-02-24 14:28:12 PST (6d 01:51 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 SONET alarms : None
 SONET defects : None

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204)
 Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
 Input packets : 0
 Output packets: 0
 Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.168.220.24/30, Local: 192.168.220.26,
 Broadcast: 192.168.220.27
 Protocol iso, MTU: 4470
 Flags: None
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 Input packets : 0
 Output packets: 0

```

### show interfaces brief (ATM1, SONET Mode)

```
user@host> show interfaces at-1/0/0 brief
Physical interface: at-1/0/0, Enabled, Physical link is Up
 Description: to allspice at-1/0/0
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None

Logical interface at-1/0/0.0
 Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
 inet 192.168.220.26/30
 iso
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
```

### show interfaces detail (ATM1, SONET Mode)

```
user@host> show interfaces at-1/0/0 detail
Physical interface: at-1/0/0, Enabled, Physical link is Up
 Interface index: 300, SNMP ifIndex: 194, Generation: 183
 Description: to allspice at-1/0/0
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:02:38:7e
 Last flapped : 2006-02-24 14:28:12 PST (6d 01:55 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 Egress queues: 4 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 0 0 0

 SONET alarms : None
 SONET defects : None

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204) (Generation 5)
 Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
```

```

Output bytes : 0
Input packets: 0
Output packets: 0
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Protocol inet, MTU: 4470, Generation: 13, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 192.168.220.24/30, Local: 192.168.220.26,
Broadcast: 192.168.220.27, Generation: 14
Protocol iso, MTU: 4470, Generation: 14, Route table: 0
Flags: None
VCI 0.128
Flags: Active
Total down time: 0 sec, Last down: Never
ATM per-VC transmit statistics:
Tail queue packet drops: 0
Traffic statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

```

#### show interfaces extensive (ATM, SONET Mode)

```

user@host> show interfaces at-1/0/0 extensive
Physical interface: at-1/0/0, Enabled, Physical link is Up
Interface index: 300, SNMP ifIndex: 194, Generation: 183
Description: to allspice at-1/0/0
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None
CoS queues : 4 supported, 4 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:7e
Last flapped : 2006-02-24 14:28:12 PST (6d 01:56 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Input errors:
Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

Resource errors: 0
Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 0 0 0
1 expedited-fo 0 0 0

```

```

2 assured-forw 0 0 0

3 network-cont 0 0 0

SONET alarms : None
SONET defects : None
SONET PHY:
Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 0 0 OK
SONET section:
 BIP-B1 0 0
 SEF 0 0 OK
 LOS 0 0 OK
 LOF 0 0 OK
 ES-S 0
 SES-S 0
 SEFS-S 0
SONET line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 0 0 OK
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 ES-L 0
 SES-L 0
 UAS-L 0
 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 0 0 OK
 RDI-P 0 0 OK
 UNEQ-P 1 1 OK
 PLM-P 0 0 OK
 ES-P 1
 SES-P 1
 UAS-P 0
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Received SONET overhead:
 F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x13, C2(cmp) : 0x13, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x13, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00
ATM status:
HCS state: Sync
LOC : OK
ATM Statistics:
Uncorrectable HCS errors: 0, Correctable HCS errors: 0,
Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,

```

```

Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
 Destination slot: 1
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 147744000 95 0 low none
3 network-control 5 7776000 5 0 low none

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204) (Generation 5)
Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 4470, Generation: 13, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.168.220.24/30, Local: 192.168.220.26,
 Broadcast: 192.168.220.27, Generation: 14
Protocol iso, MTU: 4470, Generation: 14, Route table: 0
 Flags: None
VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 ATM per-VC transmit statistics:
 Tail queue packet drops: 0
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

```

#### show interfaces (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1
Physical interface: at-0/2/1, Enabled, Physical link is Up
Interface index: 154, SNMP ifIndex: 42
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None
CoS queues : 4 supported, 4 maximum usable queues
Current address: 00:05:85:8f:30:3f
Last flapped : 2006-03-24 13:29:58 PST (00:04:48 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
SDH alarms : None

```

```
SDH defects : None
 VPI 0
 Flags: Active
 Total down time: 0 sec, Last down: Never
Traffic statistics:
 Input packets: 0
 Output packets: 0

Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
 Input packets : 0
 Output packets: 0
 Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.12.6, Local: 10.0.12.5
 Protocol iso, MTU: 4470
 Flags: None
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0
 Input packets : 0
 Output packets: 0

Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50)
 Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
 Encapsulation: ATM-VCMUX
 Input packets : 0
 Output packets: 0
 VCI 0.4
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 0, Transmit weight cells: 0
 Input packets : 0
 Output packets: 0
```

#### show interfaces brief (ATM2, SDH Mode)

```
user@host> show interfaces at-0/2/1 brief
Physical interface: at-0/2/1, Enabled, Physical link is Up
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None
Logical interface at-0/2/1.0
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
 inet 10.0.12.5 --> 10.0.12.6
 iso
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0

Logical interface at-0/2/1.32767
 Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
 Encapsulation: ATM-VCMUX
 VCI 0.4
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 0, Transmit weight cells: 0
```



## show interfaces detail (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1 detail
Physical interface: at-0/2/1, Enabled, Physical link is Up
 Interface index: 154, SNMP ifIndex: 42, Generation: 40
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

 Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:8f:30:3f
 Last flapped : 2006-03-24 13:29:58 PST (00:05:10 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Egress queues: 4 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 0 0 0

 SDH alarms : None
 SDH defects : None
 VPI 0
 Flags: Active
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

 Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51) (Generation 25)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Protocol inet, MTU: 4470, Generation: 62, Route table: 0
 Flags: None

```

```

Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.12.6, Local: 10.0.12.5, Broadcast: Unspecified,
 Generation: 58
Protocol iso, MTU: 4470, Generation: 63, Route table: 0
 Flags: None
VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0
 ATM per-VC transmit statistics:
 Tail queue packet drops: 0
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50) (Generation 26)
 Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
 Encapsulation: ATM-VCMUX
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
VCI 0.4
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 0, Transmit weight cells: 0
 ATM per-VC transmit statistics:
 Tail queue packet drops: 0
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

```

#### show interfaces extensive (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1 extensive
Physical interface: at-0/2/1, Enabled, Physical link is Up
 Interface index: 154, SNMP ifIndex: 42, Generation: 40
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

 Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:8f:30:3f
 Last flapped : 2006-03-24 13:29:58 PST (00:06:49 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps

```

## Input errors:

Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,

Resource errors: 0

## Output errors:

Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

Resource errors: 0

Egress queues: 4 supported, 4 in use

| Queue counters: | Queued packets | Transmitted packets | Dropped packets |
|-----------------|----------------|---------------------|-----------------|
| 0 best-effort   | 0              | 0                   | 0               |
| 1 expedited-fo  | 0              | 0                   | 0               |
| 2 assured-forw  | 0              | 0                   | 0               |
| 3 network-cont  | 0              | 0                   | 0               |

SDH alarms : None

SDH defects : None

| SDH PHY:  | Seconds | Count | State |
|-----------|---------|-------|-------|
| PLL Lock  | 0       | 0     | OK    |
| PHY Light | 1       | 1     | OK    |

## SDH regenerator section:

|         |   |      |    |
|---------|---|------|----|
| RS-BIP8 | 2 | 8828 |    |
| OOF     | 2 | 2    | OK |
| LOS     | 2 | 1    | OK |
| LOF     | 2 | 1    | OK |
| RS-ES   | 4 |      |    |
| RS-SES  | 3 |      |    |
| RS-SEFS | 2 |      |    |

## SDH multiplex section:

|           |   |       |    |
|-----------|---|-------|----|
| MS-BIP24  | 2 | 771   |    |
| MS-FEBE   | 1 | 17476 |    |
| MS-FERF   | 2 | 1     | OK |
| MS-AIS    | 2 | 1     | OK |
| BERR-SF   | 0 | 0     | OK |
| BERR-SD   | 0 | 0     | OK |
| MS-ES     | 4 |       |    |
| MS-SES    | 2 |       |    |
| MS-UAS    | 0 |       |    |
| MS-ES-FE  | 3 |       |    |
| MS-SES-FE | 2 |       |    |
| MS-UAS-FE | 0 |       |    |

## SDH path:

|           |   |     |    |
|-----------|---|-----|----|
| HP-BIP8   | 1 | 6   |    |
| HP-FEBE   | 1 | 251 |    |
| HP-LOP    | 0 | 0   | OK |
| HP-AIS    | 2 | 1   | OK |
| HP-FERF   | 3 | 2   | OK |
| HP-UNEQ   | 1 | 1   | OK |
| HP-PLM    | 2 | 1   | OK |
| HP-ES     | 4 |     |    |
| HP-SES    | 3 |     |    |
| HP-UAS    | 0 |     |    |
| HP-ES-FE  | 3 |     |    |
| HP-SES-FE | 3 |     |    |
| HP-UAS-FE | 0 |     |    |

Received SDH overhead:

```

F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x13, C2(cmp) : 0x13, F2 : 0x00
Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SDH overhead:
F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x13, F2 : 0x00, Z3 : 0x00
Z4 : 0x00
ATM status:
HCS state: Sync
LOC : OK
ATM Statistics:
Uncorrectable HCS errors: 0, Correctable HCS errors: 0,
Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,
Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
Destination slot: 0
VPI 0
Flags: Active
Total down time: 0 sec, Last down: Never
Traffic statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51) (Generation 25)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
Traffic statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Local statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Protocol inet, MTU: 4470, Generation: 62, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.0.12.6, Local: 10.0.12.5, Broadcast: Unspecified,
Generation: 58
Protocol iso, MTU: 4470, Generation: 63, Route table: 0
Flags: None
VCI 0.128
Flags: Active
Total down time: 0 sec, Last down: Never
EPD threshold: 2129, Transmit weight cells: 0
ATM per-VC transmit statistics:
Tail queue packet drops: 0
Traffic statistics:
Input bytes : 0
Output bytes : 0

```

```

 Input packets: 0
 Output packets: 0
Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50) (Generation 26)
Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
Encapsulation: ATM-VCMUX
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
VCI 0.4
Flags: Active
Total down time: 0 sec, Last down: Never
EPD threshold: 0, Transmit weight cells: 0
ATM per-VC transmit statistics:
Tail queue packet drops: 0
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

```

#### show interfaces (ATM2, SONET Mode)

```

user@host> show interfaces at-0/3/1
Physical interface: at-0/3/1, Enabled, Physical link is Up
Interface index: 139, SNMP ifIndex: 67
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None
CoS queues : 4 supported, 4 maximum usable queues
Current address: 00:14:f6:22:58:5e
Last flapped : 2006-03-13 17:46:36 PST (16:01:12 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
SONET alarms : None
SONET defects : None
VPI 0
Flags: Active, OAM, Shaping
CBR, Peak: 50kbps
OAM, Period 30 sec, Up count: 10, Down count: 10
Total down time: 0 sec, Last down: Never
OAM F4 cell statistics:
Total received: 4, Total sent: 4
Loopback received: 4, Loopback sent: 4
RDI received: 0, RDI sent: 0
AIS received: 0
Traffic statistics:
 Input packets: 4
 Output packets: 30
VPI 10
Flags: Active
Total down time: 0 sec, Last down: Never
Traffic statistics:
 Input packets: 0

```

```
Output packets: 0
Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77)
 Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
 Encapsulation: ATM-SNAP
 Input packets : 0
 Output packets: 0
 Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.59.5, Local: 10.0.59.6
 Protocol iso, MTU: 4470
 Flags: None
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 10
 Input packets : 0
 Output packets: 0

Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76)
 Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000
 Encapsulation: ATM-VCMUX
 Input packets : 4
 Output packets: 30
 VCI 0.16
 Flags: Active, ILMI
 Total down time: 0 sec, Last down: Never
 EPD threshold: 0, Transmit weight cells: 0
 Input packets : 0
 Output packets: 26
 VCI 0.4
 Flags: Active, OAM
 OAM, Period 30 sec, Up count: 10, Down count: 10
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0
 Input packets : 4
 Output packets: 4
 OAM F4 cell statistics:
 Total received: 4, Total sent: 4
 Loopback received: 4, Loopback sent: 4
 RDI received: 0, RDI sent: 0
 AIS received: 0, AIS sent: 0
```

#### show interfaces brief (ATM2, SONET Mode)

```
user@host> show interfaces at-0/3/1 brief
Physical interface: at-0/3/1, Enabled, Physical link is Up
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None

Logical interface at-0/3/1.0
 Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
 Encapsulation: ATM-SNAP
 inet 10.0.59.6 --> 10.0.59.5
 iso
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 10
```

```

Logical interface at-0/3/1.32767
 Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000
 Encapsulation: ATM-VCMUX
 VCI 0.16
 Flags: Active, ILMI
 Total down time: 0 sec, Last down: Never
 EPD threshold: 0, Transmit weight cells: 0
 VCI 0.4
 Flags: Active, OAM
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0

```

### show interfaces detail (ATM2, SONET Mode)

```

user@host> show interfaces at-0/3/1 detail
Physical interface: at-0/3/1, Enabled, Physical link is Up
 Interface index: 139, SNMP ifIndex: 67, Generation: 22
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:14:f6:22:58:5e
 Last flapped : 2006-03-13 17:46:36 PST (16:02:39 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 312 0 bps
 Output bytes : 2952 0 bps
 Input packets : 6 0 pps
 Output packets: 50 0 pps
 Egress queues: 4 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 44 44 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 6 6 0

 SONET alarms : None
 SONET defects : None
 VPI 0
 Flags: Active, OAM, Shaping
 CBR, Peak: 50kbps
 OAM, Period 30 sec, Up count: 10, Down count: 10
 Total down time: 0 sec, Last down: Never
 OAM F4 cell statistics:
 Total received: 6, Total sent: 6
 Loopback received: 6, Loopback sent: 6
 Last received: 00:00:29, Last sent: 00:00:29
 RDI received: 0, RDI sent: 0
 AIS received: 0
 Traffic statistics:
 Input bytes : 312
 Output bytes : 2952
 Input packets : 6
 Output packets: 50

```

## VPI 10

Flags: Active

Total down time: 0 sec, Last down: Never

## Traffic statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

## Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77) (Generation 20)

Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000

Encapsulation: ATM-SNAP

## Traffic statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

## Local statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

## Transit statistics:

|                 |   |       |
|-----------------|---|-------|
| Input bytes :   | 0 | 0 bps |
| Output bytes :  | 0 | 0 bps |
| Input packets:  | 0 | 0 pps |
| Output packets: | 0 | 0 pps |

Protocol inet, MTU: 4470, Generation: 38, Route table: 0

Flags: None

Addresses, Flags: Is-Preferred Is-Primary

Destination: 10.0.59.5, Local: 10.0.59.6, Broadcast: Unspecified,  
Generation: 44

Protocol iso, MTU: 4470, Generation: 39, Route table: 0

Flags: None

## VCI 0.128

Flags: Active

Total down time: 0 sec, Last down: Never

EPD threshold: 2129, Transmit weight cells: 10

ATM per-VC transmit statistics:

Tail queue packet drops: 0

## Traffic statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

## Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76) (Generation 21)

Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000

Encapsulation: ATM-VCMUX

## Traffic statistics:

|                 |      |
|-----------------|------|
| Input bytes :   | 360  |
| Output bytes :  | 3302 |
| Input packets:  | 6    |
| Output packets: | 50   |

## Local statistics:

|                 |      |
|-----------------|------|
| Input bytes :   | 360  |
| Output bytes :  | 3302 |
| Input packets:  | 6    |
| Output packets: | 50   |

## VCI 0.16

Flags: Active, ILMI

Total down time: 0 sec, Last down: Never



```

EPD threshold: 0, Transmit weight cells: 0
ATM per-VC transmit statistics:
 Tail queue packet drops: 0
Traffic statistics:
 Input bytes : 0
 Output bytes : 2640
 Input packets: 0
 Output packets: 44
VCI 0.4
 Flags: Active, OAM
 OAM, Period 30 sec, Up count: 10, Down count: 10
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 0
 ATM per-VC transmit statistics:
 Tail queue packet drops: 0
 Traffic statistics:
 Input bytes : 312
 Output bytes : 312
 Input packets: 6
 Output packets: 6
 OAM F4 cell statistics:
 Total received: 6, Total sent: 6
 Loopback received: 6, Loopback sent: 6
 Last received: 00:00:29, Last sent: 00:00:29
 RDI received: 0, RDI sent: 0
 AIS received: 0, AIS sent: 0

```

#### show interfaces extensive (ATM2, SONET Mode)

```

user@host> show interfaces at-0/3/1 extensive
Physical interface: at-0/3/1, Enabled, Physical link is Up
 Interface index: 139, SNMP ifIndex: 67, Generation: 22
 Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, Payload scrambler: Enabled
 Device flags : Present Running
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:14:f6:22:58:5e
 Last flapped : 2006-03-13 17:46:36 PST (16:04:12 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 520 0 bps
 Output bytes : 4240 0 bps
 Input packets: 10 0 pps
 Output packets: 72 0 pps
 Input errors:
 Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 Resource errors: 0
 Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

 Resource errors: 0
 Egress queues: 4 supported, 4 in use
 Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 62             | 62                  | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |

```

2 assured-forw 0 0 0

3 network-cont 10 10 0

SONET alarms : None
SONET defects : None
SONET PHY:
Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 0 0 OK
SONET section:
 BIP-B1 0 0
 SEF 0 0 OK
 LOS 0 0 OK
 LOF 0 0 OK
 ES-S 0
 SES-S 0
 SEFS-S 0
SONET line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 0 0 OK
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 ES-L 0
 SES-L 0
 UAS-L 0
 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 0 0 OK
 RDI-P 0 0 OK
 UNEQ-P 1 1 OK
 PLM-P 0 0 OK
 ES-P 1
 SES-P 1
 UAS-P 0
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Received SONET overhead:
 F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x13, C2(cmp) : 0x13, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x13, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00
ATM status:
HCS state: Sync
LOC : OK
ATM Statistics:
Uncorrectable HCS errors: 0, Correctable HCS errors: 0,
Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,

```

```

Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
Destination slot: 0
VPI 0
 Flags: Active, OAM, Shaping
 CBR, Peak: 50kbps
 OAM, Period 30 sec, Up count: 10, Down count: 10
 Total down time: 0 sec, Last down: Never
 OAM F4 cell statistics:
 Total received: 10, Total sent: 10
 Loopback received: 10, Loopback sent: 10
 Last received: 00:00:02, Last sent: 00:00:02
 RDI received: 0, RDI sent: 0
 AIS received: 0
 Traffic statistics:
 Input bytes : 520
 Output bytes : 4240
 Input packets: 10
 Output packets: 72
VPI 10
 Flags: Active
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77) (Generation 20)
 Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
 Encapsulation: ATM-SNAP
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Protocol inet, MTU: 4470, Generation: 38, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.59.5, Local: 10.0.59.6, Broadcast: Unspecified,
 Generation: 44
 Protocol iso, MTU: 4470, Generation: 39, Route table: 0
 Flags: None
 VCI 0.128
 Flags: Active
 Total down time: 0 sec, Last down: Never
 EPD threshold: 2129, Transmit weight cells: 10
 ATM per-VC transmit statistics:
 Tail queue packet drops: 0
 Traffic statistics:

```

```
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
```

Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76) (Generation 21)

Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000

Encapsulation: ATM-VCMUX

Traffic statistics:

```
Input bytes : 660
Output bytes : 5473
Input packets: 11
Output packets: 83
```

Local statistics:

```
Input bytes : 660
Output bytes : 5473
Input packets: 11
Output packets: 83
```

VCI 0.16

Flags: Active, ILMI

Total down time: 0 sec, Last down: Never

EPD threshold: 0, Transmit weight cells: 0

ATM per-VC transmit statistics:

Tail queue packet drops: 0

Traffic statistics:

```
Input bytes : 0
Output bytes : 4320
Input packets: 0
Output packets: 72
```

VCI 0.4

Flags: Active, OAM

OAM, Period 30 sec, Up count: 10, Down count: 10

Total down time: 0 sec, Last down: Never

EPD threshold: 2129, Transmit weight cells: 0

ATM per-VC transmit statistics:

Tail queue packet drops: 0

Traffic statistics:

```
Input bytes : 572
Output bytes : 572
Input packets: 11
Output packets: 11
```

OAM F4 cell statistics:

Total received: 11, Total sent: 11

Loopback received: 11, Loopback sent: 11

Last received: 00:00:18, Last sent: 00:00:18

RDI received: 0, RDI sent: 0

AIS received: 0, AIS sent: 0

## show interfaces (Channelized DS3-to-DS0)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces ds-fpc/pic/port:t1channel:ds0channel &lt;brief   detail   extensive&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized DS3-to-DS0 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>ds-fpc/pic/port:t1channel:ds0channel</b>—Display standard information about the specified channelized DS3-to-DS0 interface.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output interface.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (Channelized DS3-to-DS0) on page 1035</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | <a href="#">Table 49 on page 1027</a> lists the output fields for the <b>show interfaces</b> (all Channelized DS3 interfaces) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 49: Channelized DS3 show interfaces Output Fields**

| Field Name                | Field Description                                                                                                                                           | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                             |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                             | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                              | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                               | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                           | <b>detail extensive</b>      |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Clocking</b>           | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Mode</b>               | Whether C-bit parity mode or M13 mode is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels                   |
| <b>Framing</b>            | Physical layer framing format used on the link. It can be <b>ESF</b> or <b>SF</b> . The default is <b>ESF</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>Parent</b>             | (Channelized IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. <b>None</b> indicates that this interface is the top level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the "Device Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the "Interface Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the "Link Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b>      |
| <b>Keepalive settings</b> | (PPP and HDLC) Configured settings for keepalives. <ul style="list-style-type: none"> <li><b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li><b>down-count number</b>—The number of keepalive packets that a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li><b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | <b>detail extensive none</b> |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output       |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Keepalive statistics | <p>(PPP and HDLC) Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul>                                                                                                        | detail extensive none |
| LMI settings         | <p>(Frame Relay) Settings for Local Management Interface (LMI) can be either <b>ANSI LMI settings</b> or <b>ITU LMI settings</b>. ANSI LMI settings is the default. The format is (ANSI or ITU) <b>LMI settings: value, value, value...xx</b> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li><b>n391dte</b>—DTE full status polling interval (1–255)</li> <li><b>n392dce</b>—DCE error threshold (1–10)</li> <li><b>n392dte</b>—DTE error threshold (1–10)</li> <li><b>n393dce</b>—DCE monitored event count (1–10)</li> <li><b>n393dte</b>—DTE monitored event count (1–10)</li> <li><b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li><b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | detail extensive none |
| LMI                  | <p>(Frame Relay) LMI packet statistics:</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li><b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last seen hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                                                                                         | detail extensive none |
| LCP state            | <p>(PPP) Link Control Protocol state.</p> <ul style="list-style-type: none"> <li><b>Conf-ack-received</b>—Acknowledgement was received.</li> <li><b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li><b>Conf-req-sent</b>—Request was sent.</li> <li><b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li><b>Not-configured</b>—LCP is not configured on the interface.</li> <li><b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                          | detail extensive none |
| NCP state            | <p>(PPP) Network Control Protocol state.</p> <ul style="list-style-type: none"> <li><b>Conf-ack-received</b>—Acknowledgement was received.</li> <li><b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li><b>Conf-req-sent</b>—Request was sent.</li> <li><b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li><b>Not-configured</b>—NCP is not configured on the interface.</li> <li><b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                       | detail extensive none |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CHAP state</b>              | <p>(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction.</p> <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the <b>Success</b> state. (Most likely with RADIUS authentication).</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: <i>year-month-day hour:minute:second timezone hh:mm:ss ago</i></b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |



Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Input errors</b>  | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Counter increments when the software could not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Count of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value in this field increments, the PIC is malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Count of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> </ul> | <b>extensive</b> |
| <b>Output errors</b> | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly, (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b> |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>DS1 alarms</b>  | Media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>DS1 defects</b> | Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. <ul style="list-style-type: none"> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>T1 media</b>    | Counts of T1 media-specific errors. <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>The T1 media-specific error types can be:</p> <ul style="list-style-type: none"> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>BEE</b>—Bit error event</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds (section)</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>BES</b>—Bit error seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | <b>extensive</b>             |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output  |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>DS3 media</b>                 | <p>Counts of T3 media-specific errors. For detailed definitions of the T3 (DS-3) error events (BPV, EXZ, LCV, PCV, and CCV) and performance parameters (LES, PES, PSES, CES, CSES, SEFS, and UAS), see RFC 2496.</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop out of lock</li> <li>• <b>Reframing</b>—Frame alignment recovery time</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>IDLE</b>—Idle code detected</li> <li>• <b>YELLOW</b>—Remote defect indication</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CCV</b>—C-bit coding violation</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>PES</b>—P-bit errored seconds</li> <li>• <b>PSES</b>—P-bit errored seconds (section)</li> <li>• <b>CES</b>—C-bit errored seconds</li> <li>• <b>CSES</b>—C-bit severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | <b>extensive</b> |
| <b>HDLC configuration</b>        | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Byte encoding</b>—Byte encoding used: <b>Nx64K</b> or <b>Nx56K</b>.</li> <li>• <b>Data inversion</b>—HDLC data inversion setting: <b>Enabled</b> or <b>Disabled</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>Interface transmit queues</b> | <p>Name of the transmit queues and their associated statistics for each DS1 channel on the Channelized DS3-to-DS1 PIC.</p> <ul style="list-style-type: none"> <li>• <b>B/W</b>—Queue bandwidth as a percentage of the total interface bandwidth.</li> <li>• <b>WRR</b>—Weighted round-robin (in percent).</li> <li>• <b>Packets</b>—Number of packets transmitted.</li> <li>• <b>Bytes</b>—Number of bytes transmitted.</li> <li>• <b>Drops</b>—Number of packets dropped.</li> <li>• <b>Errors</b>—Number of packet errors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>DS1 or DS3 BERT configuration</b>          | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>CoS information</b>                        | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>                                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the logical interface; values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Bandwidth</b>                              | Bandwidth configured on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Protocol</b>                               | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |

Table 49: Channelized DS3 show interfaces Output Fields (*continued*)

| Field Name       | Field Description                                                                                                                                                                | Level of Output       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| MTU              | MTU size on the logical interface.                                                                                                                                               | detail extensive none |
| Generation       | Unique number for use by Juniper Networks technical support only.                                                                                                                | detail extensive      |
| Route table      | Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                                              | detail extensive      |
| Flags            | Information about the protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | detail extensive none |
| Addresses, Flags | Information about the address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.      | detail extensive none |
| Destination      | IP address of the remote side of the connection.                                                                                                                                 | detail extensive none |
| Local            | IP address of the logical interface.                                                                                                                                             | detail extensive none |
| Broadcast        | Broadcast address.                                                                                                                                                               | detail extensive none |
| Generation       | Unique number for use by Juniper Networks technical support only.                                                                                                                | detail extensive none |
| Redundant Link   | (LSQ redundancy) Backup link for Link Services IQ redundancy.                                                                                                                    | detail extensive none |

## Sample Output

### show interfaces extensive (Channelized DS3-to-DS0)

```

user@host> show interfaces ds-0/0/0:0:0 extensive
Physical interface: ds-0/0/0:0:0, Enabled, Physical link is Up
 Interface index: 174, SNMP ifIndex: 4298, Generation: 177
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps, FCS: 16,
 Mode: C/Bit parity, Framing: ESF
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 280 (last seen 00:00:09 ago)
 Output: 286 (last sent 00:00:00 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Not-configured
 Last flapped : 2002-05-23 17:53:29 PDT (00:46:46 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 6814 16 bps
 Output bytes : 28840 72 bps
 Input packets : 568 0 pps

```

```

Output packets: 893 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 39, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 2, L2 mismatch timeouts: 0,
 HS link CRC errors: 0
Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
DS1 alarms : None
DS3 alarms : None
DS1 defects : None
DS3 defects : None
T1 media:
 Seconds Count State
SEF 0 0 OK
BEE 5 1 OK
AIS 0 0 OK
LOF 0 0 OK
LOS 0 0 OK
YELLOW 17 1 OK
BPV 0 0
EXZ 0 0
LCV 5 27765
PCV 0 0
CS 0 0
LES 0
ES 0
SES 5
SEFS 10
BES 0
UAS 0
DS3 media:
 Seconds Count State
PLL Lock 0 0 OK
Reframing 0 0 OK
AIS 0 0 OK
LOF 0 0 OK
LOS 0 0 OK
IDLE 0 0 OK
YELLOW 0 0 OK
BPV 1 65535
EXZ 1 65535
LCV 2 131070
PCV 1 1825
CCV 0 0
LES 1
PES 1
PSES 1
CES 0
CSES 0
SEFS 0
UAS 0
Interface transmit queues:
 B/W WRR Packets Bytes Drops Errors
Queue0 95 95 0 0 0 0
Queue1 5 5 893 28840 0 0
HDLC configuration:
 Giant threshold: 1514, Runt threshold: 3
 Timeslots : 1-10
 Byte encoding: Nx64K, Data inversion: Disabled
DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, Induced error rate: 10e-0
DS1 BERT configuration:

```

BERT time period: 10 seconds, Elapsed: 0 seconds  
Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)  
Packet Forwarding Engine configuration:  
Destination slot: 0, PLP byte: 2 (0x01)  
CoS information: CoS transmit queue Bandwidth Buffer  
Priority Limit % bps % usec  
0 best-effort 95 608000 95 0 low none  
3 network-control 5 32000 5 0 low none  
Logical interface ds-0/0/0:0:0.0 (Index 5) (SNMP ifIndex 4299)  
(Generation 943)  
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP  
Protocol inet, MTU: 1500, Generation: 949, Route table: 0  
Flags: None  
Addresses, Flags: Is-Preferred Is-Primary  
Destination: 18.18.18.1, Local: 18.18.18.2, Broadcast: Unspecified,  
Generation: 1849

## show interfaces (Channelized DS3-to-DS1)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces t1-fpc/pic/port:t1channel</code><br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized DS3-to-DS1 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <b>t1-fpc/pic/port:t1channel</b> —Display standard information about the specified channelized DS3-to-DS1 interface.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display brief interface information.<br><br><b>descriptions</b> —(Optional) Display interface description strings.<br><br><b>media</b> —(Optional) Display media-specific information about network interfaces.<br><br><b>snmp-index <i>snmp-index</i></b> —(Optional) Display information for the specified SNMP index of the interface.<br><br><b>statistics</b> —(Optional) Display static interface statistics. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (channelized DS3-to-DS1) on page 1038</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | See the output field table for the <a href="#">show interfaces (Channelized DS3-to-DS0) command</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### show interfaces extensive (channelized DS3-to-DS1)

```
user@host> show interfaces t1-0/0/0:0 extensive
Physical interface: t1-0/0/0:0, Enabled, Physical link is Up
 Interface index: 210, SNMP ifIndex: 14, Generation: 2977
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
 Loopback: None, FCS: 16, Mode: C/Bit parity, Framing: ESF
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 30 (last seen 00:00:05 ago)
 Output: 29 (last sent 00:00:00 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
```



```

CHAP state: Not-configured
Last flapped : 2002-05-23 17:30:12 PDT (17:29:43 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 944 16 bps
 Output bytes : 1162 16 bps
 Input packets : 66 0 pps
 Output packets: 82 0 pps
Input errors:
 Errors: 1, Drops: 0, Framing errors: 1, Policed discards: 8,
 L3 incompletes: 0, L2 channel errors: 1, L2 mismatch timeouts: 0,
 HS link CRC errors: 0, SRAM errors: 0
Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
DS1 alarms : None
DS3 alarms : None
DS1 defects : None
DS3 defects : None
T1 media:
 Seconds Count State
 SEF 0 0 OK
 BEE 11 5 OK
 AIS 28 1 OK
 LOF 27 1 OK
 LOS 0 0 OK
 YELLOW 23 1 OK
 BPV 0 0
 EXZ 0 0
 LCV 11 20574
 PCV 0 0
 CS 0 0
 LES 28
 ES 28
 SES 39
 SEFS 50
 BES 0
 UAS 0
DS3 media:
 Seconds Count State
 PLL Lock 0 0 OK
 Reframing 0 0 OK
 AIS 0 0 OK
 LOF 1 1 OK
 LOS 1 1 OK
 IDLE 0 0 OK
 YELLOW 0 0 OK
 BPV 2 131070
 EXZ 3 49910
 LCV 5 180980
 PCV 2 327
 CCV 12 264558
 LES 3
 PES 3
 PSES 2
 CES 13
 CSES 13
 SEFS 1
 UAS 35
Interface transmit queues:
 B/W WRR Packets Bytes Drops Errors
 Queue0 95 95 0 0 0 0
 Queue1 5 5 82 1162 0 0
HDLC configuration:

```

```
Giant threshold: 1514, Runt threshold: 3
Timeslots : 1-10
Line encoding: B8ZS, Byte encoding: Nx64K, Data inversion: Disabled
DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, Induced error rate: 10e-0
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 2 (0x00) CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 608000 95 0 low none
3 network-control 5 32000 5 0 low none
Logical interface t1-0/0/0:0.0 (Index 11) (SNMP ifIndex 23) (Generation 497)
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500, Generation: 576, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
 Destination: 21.21.21.2, Local: 21.21.21.1, Broadcast: Unspecified,
 Generation: 977
```

## show interfaces (Channelized E1 IQ)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces (ce1-fpc/pic/port   type-fpc/pic/port&lt;:channel&gt;) &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized E1 IQ interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>type-fpc/pic/port:&lt;channel&gt;</b>—Interface type with optional corresponding channel levels. For the physical channelized E1 IQ interface, <b>type</b> is <b>ce</b>. For the clear channel, <b>type</b> is <b>e1</b>. At the first level of channelization, <b>type</b> is <b>ds</b>.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (Channelized E1 IQ) (Physical) on page 1041</a></p> <p><a href="#">show interfaces extensive (Channelized E1 IQ Multilink PPP Encapsulation) on page 1042</a></p> <p><a href="#">show interfaces extensive (Channelized E1 IQ MLFR Encapsulation) on page 1043</a></p> <p><a href="#">show interfaces detail (Clear Channel E1) on page 1044</a></p>                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | For information about output fields, see the output field table for the <a href="#">show interfaces (Channelized E1)</a> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### show interfaces (Channelized E1 IQ) (Physical)

```
user@host> show interfaces ce1-1/2/3
Physical interface: ce1-1/2/3, Enabled, Physical link is Up
 Interface index: 18, SNMP ifIndex: 1128
 Link-level type: Frame-relay, Controller, MTU: 1504, Clocking: Internal, Speed:
E1, Loopback: None, FCS: 16, Framing: G704, Parent: None
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives DTE
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
```

```

LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
Nonmatching DCE-end DLCIs:
 2
Last flapped : 2002-10-04 17:52:51 PDT (00:32:57 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
DS1 alarms : None
DS1 defects : None

```

#### show interfaces extensive (Channelized E1 IQ Multilink PPP Encapsulation)

```

user@host> show interfaces ds-0/3/4:1 extensive
Physical interface: ds-0/3/4:1, Enabled, Physical link is Up
Interface index: 151, SNMP ifIndex: 63, Generation: 34
Link-level type: Multilink-PPP, MTU: 1518, Clocking: Internal, Speed: 64kbps,
Loopback: None, FCS: 16,
Parent: ce1-0/3/4 Interface index 150
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
LCP state: Down
CHAP state: Closed
CoS queues : 4 supported, 4 maximum usable queues
Last flapped : Never
Statistics last cleared: 2005-12-21 10:32:15 PST (1w0d 03:10 ago)
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 6070570 224 bps
 Input packets : 0 0 pps
 Output packets: 209330 0 pps
Input errors:
 Errors: 3, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
 Resource errors: 0
HDLC configuration:
 Giant threshold: 1528, Runt threshold: 2
 Timeslots : 1
 Data inversion: Disabled, Idle cycle flag: flags, Start end flag: shared

```

```

DSO BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 4 (0x00)

Logical interface ds-0/3/4:1.0 (Index 74) (SNMP ifIndex 64) (Generation 13)
 Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
 Protocol mlppp, Multilink bundle: ls-0/1/0.0, MTU: 1514, Generation: 24,
 Route table: 0

```

### show interfaces extensive (Channelized E1 IQ MLFR Encapsulation)

```

user@host> show interfaces ds-0/3/4:5 extensive
Physical interface: ds-0/3/4:5, Enabled, Physical link is Up
 Interface index: 155, SNMP ifIndex: 72, Generation: 38
 Link-level type: Multilink-FR, MTU: 1518, Clocking: Internal, Speed: 64kbps,
 Loopback: None, FCS: 16,
 Parent: ce1-0/3/4 Interface index 150
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : No-Keepalives DCE
 Hold-times : Up 0 ms, Down 0 ms
 ANSI LMI settings: n392dce 3, n393dce 4, t392dce 15 seconds
 LMI statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 DTE statistics:
 Enquiries sent : 0
 Full enquiries sent : 0
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timeout : 0
 CoS queues : 4 supported, 4 maximum usable queues
 Last flapped : 2005-12-21 09:59:01 PST (1w0d 03:44 ago)
 Statistics last cleared: 2005-12-21 10:32:15 PST (1w0d 03:10 ago)
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Input errors:
 Errors: 3, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
 Resource errors: 0
 HDLC configuration:
 Giant threshold: 1528, Runt threshold: 2
 Timeslots : 5
 Data inversion: Disabled, Idle cycle flag: flags, Start end flag: shared

```

```

DSO BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 4 (0x01)

Logical interface ds-0/3/4:5.0 (Index 78) (SNMP ifIndex 73) (Generation 17)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol mlfrr, Multilink bundle: ls-0/1/0.1, MTU: 1514, Generation: 28, Route
table: 0
 DLCI 10
 Flags: Active
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :1 Inactive DLCI :0

```

#### show interfaces detail (Clear Channel E1)

```

user@host> show interfaces e1-1/2/6 detail
Physical interface: e1-1/2/6, Enabled, Physical link is Up
 Interface index: 89, SNMP ifIndex: 1278, Generation: 341
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1, Loopback:None,
...
 Logical interface e1-1/2/6.0 (Index 52) (SNMP ifIndex 1279) (Generation 169)
 Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
 Bandwidth: 0
...

```

## show interfaces (Channelized E1)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces ds-fpc/pic/port:ds0channel &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | (M Series and T Series routers only) Display status information the specified channelized E1 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>ds-fpc/pic/port:ds0channel</b>—Display standard information about the specified channelized E1 interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (Channelized E1) on page 1054</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>            | <a href="#">Table 50 on page 1045</a> lists the output fields for the <b>show interfaces</b> (Channelized E1 and Channelized E1 IQ) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                       |

**Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields**

| Field Name                | Field Description                                                                                                                                           | Level of Output       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Physical Interface</b> |                                                                                                                                                             |                       |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                             | All levels            |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels            |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                              | detail extensive none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                               | detail extensive none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                           | detail extensive      |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Clocking</b>           | Reference clock source: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Framing</b>            | Physical layer framing format used on the link. It can be <b>G704</b> , <b>G704-NO-CRC4</b> , or <b>Unframed</b> . The default is <b>G704</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Parent</b>             | (Channelized E1 IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. <b>None</b> indicates that this interface is the top level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the "Device Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the "Interface Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the "Link Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Keepalive settings</b> | (PPP and HDLC) Configured settings for keepalives. <ul style="list-style-type: none"> <li>• <b>Interval <i>seconds</i></b>—Time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li>• <b>Down-count <i>number</i></b>—Number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li>• <b>Up-count <i>number</i></b>—Number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | <b>detail extensive none</b> |



Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output       |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Keepalive statistics | <p>(PPP and HDLC) Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li>(<b>last seen 00:00:00 ago</b>)—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li>(<b>last seen 00:00:00 ago</b>)—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul>                                                                         | detail extensive none |
| LMI settings         | <p>(Frame Relay) Settings for link management can be either ANSI LMI settings or ITU LMI settings. ANSI LMI settings is the default. The format is (<b>ANSI or ITU</b>) <b>LMI settings: value, value...xx</b> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li><b>n391dte</b>—DTE full status polling interval (1–255)</li> <li><b>n392dce</b>—DCE error threshold (1–10)</li> <li><b>n392dte</b>—DTE error threshold (1–10)</li> <li><b>n393dce</b>—DCE monitored event count (1–10)</li> <li><b>n393dte</b>—DTE monitored event count (1–10)</li> <li><b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li><b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | detail extensive none |
| LMI                  | <p>(Frame Relay) Statistics about the link management.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b></li> <li><b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                                            | detail extensive none |
| DTE statistics       | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE):</p> <ul style="list-style-type: none"> <li><b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li><b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li><b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li><b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                                                             | detail extensive none |
| DCE statistics       | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li><b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li><b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li><b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li><b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                                                                    | detail extensive none |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li><b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li><b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li><b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li><b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <code>n392dte</code> or <code>n393dce</code> intervals. (See <a href="#">LMI settings</a>).</li> </ul>                                                                                              | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay, displayed only from the DTE) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>LCP state</b>                 | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li><b>Conf-ack-received</b>—Acknowledgement was received.</li> <li><b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li><b>Conf-req-sent</b>—Request was sent.</li> <li><b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li><b>Not-configured</b>—LCP is not configured on the interface.</li> <li><b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>CHAP state</b>                | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li><b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li><b>Chap-Chal-sent</b>—Challenge was sent.</li> <li><b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li><b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li><b>Closed</b>—CHAP authentication is incomplete.</li> <li><b>Failure</b>—CHAP authentication failed.</li> <li><b>Not-configured</b>—CHAP is not configured on the interface.</li> <li><b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went down to up. The format is <b>Last flapped: <i>year-month-day hour:minute:second timezone (hour:minute:second ago)</i></b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>CoS Queues</b>                | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Input Rate</b>                | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | None specified               |
| <b>Output Rate</b>               | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | None specified               |
| <b>Statistics last cleared</b>   | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>      |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b> | <p>Number of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Input errors</b>       | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b> | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), then either the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets larger than the MTU threshold.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>DS1 alarms</b>    | <p>E1 media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see <i>Bellcore Telcordia GR-499-CORE</i>.</p> <ul style="list-style-type: none"> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>DS1 defects</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output  |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>E1 media</b>                  | <p>Active alarms and defects, plus counts of specific E1 errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than OK indicates a problem.</li> </ul> <p>The E1 media-specific error types can be:</p> <ul style="list-style-type: none"> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>BEE</b>—Bit error</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>FEBS</b>—Far-end block error</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>BES</b>—Bursty errored seconds</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | <b>extensive</b> |
| <b>HDLC configuration</b>        | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Line encodingHDB3</b>—Line encoding used.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b> |
| <b>Interface transmit queues</b> | <p>Names of the transmit queues and their associated statistics for each DSO channel on the Channelized E1 to DSO PIC.</p> <ul style="list-style-type: none"> <li>• <b>B/W</b>—Queue bandwidth as a percentage of the total interface bandwidth.</li> <li>• <b>WRR</b>—Weighted round robin (in percent).</li> <li>• <b>Packets</b>—Number of packets transmitted.</li> <li>• <b>Bytes</b>—Number of bytes transmitted.</li> <li>• <b>Drops</b>—Number of packets dropped.</li> <li>• <b>Errors</b>—Number of packet errors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b> |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>DSx BERT configuration</b>                 | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>CoS information</b>                        | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>                                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Input packets</b>                          | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | None specified               |

Table 50: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | None specified               |
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the logical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Local statistics</b>   | (Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than one second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Transit statistics</b> | (Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Protocol</b>           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Multilink bundle</b>   | (Multilink) Interface name for the multilink bundle, if configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>DLCI</b>               | <p>(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b>, <b>Total down time</b>, <b>Last down</b>, and <b>Traffic statistics</b>. <b>Flags</b> is one or more of the following:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when link is active, but no information is received from the DCE.</li> <li>• <b>Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>Dce-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b>    | <p>(Frame Relay) Data-link connection identifier (DLCI) statistics.</p> <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |

## Sample Output

### show interfaces extensive (Channelized E1)

```

user@host> show interfaces ds-0/1/1:1 extensive
Physical interface: ds-0/1/1:1, Enabled, Physical link is Down
 Interface index: 163, SNMP ifIndex: 37, Generation: 46
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1,
 Loopback: None, FCS: 16, Framing: G704
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 CoS queues : 4 supported, 4 maximum usable queues
 Last flapped : 2005-12-28 14:44:06 PST (00:00:30 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 HS link CRC errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
 Resource errors: 0
DS1 alarms : LOF, LOS
DS1 defects : LOF, LOS
E1 media:
 Seconds Count State
SEF 982318 1 Defect Active
BEE 0 0 OK
AIS 0 0 OK
LOF 982318 1 Defect Active
LOS 982318 1 Defect Active
YELLOW 0 0 OK
BPV 1 1
EXZ 1 1
LCV 1 1
PCV 1 2
CS 0 0
FEBE 1 9
LES 1
ES 982318
SES 982318
SEFS 982318
BES 1
UAS 0
Interface transmit queues:
 B/W WRR Packets Bytes Drops Errors
Queue0 95 95 0 0 0 0
Queue1 5 5 0 0 0 0
HDLC configuration:
 Giant threshold: 1514, Runt threshold: 3
 Timeslots : 31
 Line encoding: HDB3, Data inversion: Disabled, Idle cycle flag: flags,
 Start end flag: shared
DS1 BERT configuration:
 BERT time period: 0 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^11 - 1, 0.152 and 0.153 (2047 type),

```



Pseudorandom (8)  
Packet Forwarding Engine configuration:  
Destination slot: 0, PLP byte: 2 (0x1b)  
CoS information:

| CoS | transmit queue  | %  | Bandwidth<br>bps | %  | Buffer<br>usec | Priority | Limit |
|-----|-----------------|----|------------------|----|----------------|----------|-------|
| 0   | best-effort     | 95 | 1945600          | 95 | 0              | low      | none  |
| 3   | network-control | 5  | 102400           | 5  | 0              | low      | none  |

## show interfaces (Channelized OC12 IQ and IQE)

**Syntax** `show interfaces (type-fpc/pic/port<:channel><:channel><:channel>)  
<brief | detail | extensive | terse>  
<descriptions>  
<media>  
<snmp-index snmp-index>  
<statistics>`

**Release Information** Command introduced before Junos OS Release 7.4.

**Description** Display status information about the specified channelized OC12 IQ and IQE interface.

**Options** `type-fpc/pic/port:channel:channel:channel`—Interface type with optional corresponding channel levels.  
For SONET mode, the interface type can be one of the following:

- `type-fpc/pic/port`—For the physical channelized OC12 IQ or IQE interface, **type** is `coc12`. For the clear channel, **type** is `so` (for OC12).
- `type-fpc/pic/port:channel`—At the first level of channelization, **type** can be `coc1` (channelized OC1), `ct3` (from `coc1`), `so` (for OC3), or `t3`.
- `type-fpc/pic/port:channel:channel`—At the second level of channelization, **type** can be `ct1` (from `ct3` or `coc1`) or `t1` (from `ct3` or `coc1`).
- `type-fpc/pic/port:channel:channel:channel`—At the third level of channelization, **type** is `ds` (from `ct1`).

For SDH mode, the interface type can be one of the following:

- `type-fpc/pic/port`—For the physical channelized OC12 IQ or IQE interface, **type** is `cstm4`. For the clear channel, **type** is `so` (for SONET/SDH (vc-4-4c)).
- `type-fpc/pic/port:channel`—At the first level of channelization, **type** can be `so` (from `cstm4`) or `cau4` (from `cstm4`).
- `type-fpc/pic/port:channel:channel`—At the second level of channelization, **type** can be `ct3` or `t3` (from or `cau4`).
- `type-fpc/pic/port:channel:channel:channel`—At the third level of channelization, **type** is `ct1` or `t1` (from `ct3`).
- `type-fpc/pic/port:channel:channel:channel:channel`—At the fourth level of channelization, **type** is `ds` (from `ct1`).

**brief | detail | extensive | terse**—(Optional) Display the specified level of output.

**descriptions**—(Optional) Display interface description strings.

**media**—(Optional) Display media-specific information about network interfaces.

**snmp-index snmp-index**—(Optional) Display information for the specified SNMP index of the interface.

**statistics**—(Optional) Display static interface statistics.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (CAU4 on Channelized OC-12 IQ) on page 1057</a><br><a href="#">show interfaces extensive (Channelized OC1 on Channelized OC12 IQ) on page 1057</a><br><a href="#">show interfaces extensive (Channelized OC12 IQ) (Physical) on page 1057</a><br><a href="#">show interfaces extensive (Channelized T1 from Channelized OC12 IQ) on page 1058</a><br><a href="#">show interfaces extensive (Channelized T3 on Channelized OC12 IQ) on page 1058</a><br><a href="#">show interfaces extensive (CSTM4 on Channelized OC-12 IQ) on page 1058</a><br><a href="#">show interfaces extensive (DS0 on Channelized OC12 IQ) on page 1058</a><br><a href="#">show interfaces extensive (SONET Interface on Channelized OC12 IQ) on page 1058</a><br><a href="#">show interfaces extensive (T1 on Channelized OC12 IQ) on page 1059</a> |
| <b>Output Fields</b>            | See the output field table for the <a href="#">show interfaces (Channelized OC3 IQ and IQE)</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### show interfaces extensive (CAU4 on Channelized OC-12 IQ)

```
user@host> show interfaces cau4-0/2/0:1 extensive
Physical interface: cau4-0/2/0:1, Enabled, Physical link is Up
 Interface index: 219, SNMP ifIndex: 139, Generation: 221
 Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
 Loopback: None, Parent: cstm4-0/2/0 Interface index 216
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : None
...
```

### show interfaces extensive (Channelized OC1 on Channelized OC12 IQ)

```
user@host> show interfaces extensive coc1-4/2/0:7
Physical interface: coc1-4/2/0:7, Enabled, Physical link is Up
 Interface index: 381, SNMP ifIndex: 2524, Generation: 728
 Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: 51840kbps, Loopback: None,
 FCS: 16, Payload scrambler: Disabled, Parent: coc12-4/2/0 (Index 266)
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : None
...
```

### show interfaces extensive (Channelized OC12 IQ) (Physical)

```
user@host> show interfaces extensive coc12-4/2/0
Physical interface: coc12-4/2/0, Enabled, Physical link is Up
 Interface index: 266, SNMP ifIndex: 1269, Generation: 601
 Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC12, Loopback: None,
 FCS: 16, Payload scrambler: Disabled, Parent: None Device flags : Present
Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives DTE
...
```

**show interfaces extensive (Channelized T1 from Channelized OC12 IQ)**

```
user@host> show interfaces extensive ct1-4/2/0:7:1
Physical interface: ct1-4/2/0:4:1, Enabled, Physical link is Up
 Interface index: 305, SNMP ifIndex: 2410, Generation: 640
 Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1,
 Loopback: None, FCS: 16,
 Framing: ESF, Parent: coc1-4/2/0:7 (Index 304)
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : None
...
```

**show interfaces extensive (Channelized T3 on Channelized OC12 IQ)**

```
user@host> show interfaces ct3-0/2/0:1 extensive
Physical interface: ct3-0/2/0:1:1, Enabled, Physical link is Up
 Interface index: 220, SNMP ifIndex: 140, Generation: 222
 Link-level type: Controller, Clocking: Internal, Speed: T3, Loopback: None,
 Mode: C/Bit parity, Parent: cau4-0/2/0:1 Interface index 219
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : None
...
```

**show interfaces extensive (CSTM4 on Channelized OC-12 IQ)**

```
user@host> show interfaces cstm4-0/2/0 extensive
Physical interface: cstm4-0/2/0, Enabled, Physical link is Up
 Interface index: 216, SNMP ifIndex: 33, Generation: 218
 Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC12,
 Loopback: None, Parent: None Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : None
...
```

**show interfaces extensive (DS0 on Channelized OC12 IQ)**

```
user@host> show interfaces extensive ds-4/2/0:7:1:1
Physical interface: ds-4/2/0:4:1:1, Enabled, Physical link is Up
 Interface index: 306, SNMP ifIndex: 2411, Generation: 641
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps,
 Loopback: None, FCS: 16, Parent: ct1-4/2/0:7:1 (Index 305)
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives
...
```

**show interfaces extensive (SONET Interface on Channelized OC12 IQ)**

```
user@host> show interfaces so-0/2/0:1 extensive
Physical interface: so-0/2/0:1, Enabled, Physical link is Up
 Interface index: 750, SNMP ifIndex: 23, Generation: 11709
 Link-level type: Multilink-FR, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, FCS: 16,
 Payload scrambler: Enabled, Parent: coc12-0/2/0 Interface index 749
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives DTE
...
```

**show interfaces extensive (T1 on Channelized OC12 IQ)**

```
user@host> show interfaces t1-0/2/0:1:1 extensive
Physical interface: t1-0/2/0:1:1:1, Enabled, Physical link is Up
Interface index: 222, SNMP ifIndex: 143, Generation: 226
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF, Parent: ct3-0/2/0:1:1
Interface index 221
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives
...
```

## show interfaces (Channelized OC12)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces t3-fpc/pic/port:t3channel</code><br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display status information about the specified channelized OC12 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <b>t3-fpc/pic/port:t3channel</b> —Display standard information about the specified channelized OC12 interface.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>descriptions</b> —(Optional) Display interface description strings.<br><br><b>media</b> —(Optional) Display media-specific information about network interfaces.<br><br><b>snmp-index <i>snmp-index</i></b> —(Optional) Display information for the specified SNMP index of the interface.<br><br><b>statistics</b> —(Optional) Display static interface statistics. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (Channelized OC12) on page 1060</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | See the output field table for the <a href="#">show interfaces (Channelized OC3 IQ and IQE)</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Sample Output

### show interfaces extensive (Channelized OC12)

```
user@host> show interfaces t3-0/3/0:0 extensive
Physical interface: t3-0/3/0:0, Enabled, Physical link is Up
 Interface index: 32, SNMP ifIndex: 21, Generation: 2719
 Link-level type: Frame-Relay, PPP, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: T3, Loopback: None, SONET Loopback: None, FCS: 16, Mode: C/Bit parity
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives DTE
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
 DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
 DCE statistics:
```

```

Enquiries received : 0
Full enquiries received : 0
Enquiry responses sent : 0
Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
Nonmatching DCE-end DLCIs:
 2
Hold-times : Up 0 ms, Down 0 ms
Last flapped : 2002-05-23 16:59:03 PDT (18:23:58 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 1700 0 bps
 Output bytes : 1714 0 bps
 Input packets: 123 0 pps
 Output packets: 124 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 1100817, Bucket drops: 0,
 Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM errors: 0
Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
DS3 alarms : None
SONET alarms : None
DS3 defects : None
SONET defects : None
DS3 media:
 Seconds Count State
 AIS 0 0 OK
 LOF 18 1 OK
 LOS 0 0 OK
 IDLE 0 0 OK
 YELLOW 0 0 OK
 BPV 0 0
 EXZ 0 0
 LCV 0 0
 PCV 36 122399
 CCV 72 91948
 LES 0
 PES 18
 PSES 18
 CES 18
 CSES 18
 SEFS 18
 UAS 0
HDLCD configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 4484, Runt threshold: 3
DSU configuration:
 Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
 FEAC loopback: Inactive, Response: Disabled, Count: 0
DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: Unknown (0), Induced error rate: 10e-0
Interface transmit queues:
 B/W WRR Packets Bytes Drops Errors
Queue0 95 95 0 0 0 0
Queue1 5 5 529 6348 0 0

```

```

SONET PHY: Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 20 1 OK
SONET section:
 BIP-B1 0 0
 SEF 20 1 OK
 LOS 20 1 OK
 LOF 20 1 OK
 ES-S 20
 SES-S 20
 SEFS-S 20
SONET line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 0 0 OK
 BERR-SF 18 1 OK
 BERR-SD 2 1 OK
 ES-L 20
 SES-L 20
 UAS-L 10
 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 20 1 OK
 AIS-P 0 0 OK
 RDI-P 0 0 OK
 UNEQ-P 0 0 OK
 PLM-P 20 1 OK
 ES-P 20
 SES-P 20
 UAS-P 10
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Received SONET overhead:
 F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x04, C2(cmp) : 0x04, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00, V5 : 0x00
 V5(cmp) : 0x00
Transmitted SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0x04, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00, V5 : 0x00
Received path trace: t3-0/3/0:0
 74 33 2d 30 2f 33 2f 30 3a 30 00 00 00 00 0d 0a t3-0/3/0:0:.....
Transmitted path trace: t3-0/3/0:0
 74 33 2d 30 2f 33 2f 30 3a 30 00 00 00 00 00 00 t3-0/3/0:0:.....
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
 0 best-effort 95 42499200 95 0 low none
 3 network-control 5 2236800 5 0 low none
Logical interface t3-0/3/0:0.0 (Index 11) (SNMP ifIndex 268) (Generation 499)
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 4470, Generation: 578, Route table: 0

```



```
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
 Destination: 22.22.22.1, Local: 22.22.22.2, Broadcast: Unspecified,
Generation: 98
DLCI 100
 Flags: Active, Dce-configured
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :2 Inactive DLCI : 0
```

## show interfaces (Channelized OC3 IQ and IQE)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces (<i>type-fpc/pic/port &lt;:channel&gt;&lt;:channel&gt;&lt;:channel&gt;</i>)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;descriptions&gt;</code><br><code>&lt;media&gt;</code><br><code>&lt;snmp-index <i>snmp-index</i>&gt;</code><br><code>&lt;statistics&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized OC3 IQ or IQE interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b><i>type-fpc/pic/port:channel:channel:channel</i></b>—Interface type with optional corresponding channel levels. The interface type can be one of the following:</p> <ul style="list-style-type: none"><li>• <b><i>type-fpc/pic/port</i></b>—For the physical interface, <b><i>type</i></b> is <b>coc3</b>. For the clear channel, <b><i>type</i></b> is <b>so</b> (for OC3).</li><li>• <b><i>type-fpc/pic/port:channel</i></b>—At the first level of channelization, <b><i>type</i></b> can be <b>coc1</b> (channelized OC1), <b>ct3</b> (from <b>coc1</b>), or <b>t3</b> (from <b>coc1</b>).</li><li>• <b><i>type-fpc/pic/port:channel:channel</i></b>—At the second level of channelization, <b><i>type</i></b> can be <b>ct1</b> (from <b>coc1</b> or <b>ct3</b>) or <b>t1</b> (from <b>coc1</b> or <b>ct3</b>).</li><li>• <b><i>type-fpc/pic/port:channel:channel:channel</i></b>—At the third level of channelization, <b><i>type</i></b> can be <b>ds</b> (from <b>ct1</b>).</li></ul> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (Channelized OC3 IQ) (Physical) on page 1078</a><br><a href="#">show interfaces extensive (Channelized OC1 on Channelized OC3 IQ) on page 1079</a><br><a href="#">show interfaces extensive (Channelized T1 on Channelized OC3 IQ) on page 1080</a><br><a href="#">show interfaces extensive (DSO on Channelized OC3 IQ) on page 1081</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | <a href="#">Table 51 on page 1065</a> lists the output fields for the <b>show interfaces</b> (all Channelized OC interfaces) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 51: Channelized OC show interfaces Output Fields

| Field Name                | Field Description                                                                                                                                                         | Level of Output              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                           |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                           | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .               | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                            | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                             | <b>detail extensive none</b> |
| <b>Description</b>        | Interface description.                                                                                                                                                    | All levels                   |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                         | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                       | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                       | All levels                   |
| <b>Clocking</b>           | SONET/SDH reference clock source. It can be <b>Internal</b> or <b>External</b> . Clocking is configured and displayed only for channel 0.                                 | All levels                   |
| <b>Framing mode</b>       | Framing mode: <b>SONET</b> or <b>SDH</b> .                                                                                                                                | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                  | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                   | All levels                   |
| <b>SONET loopback</b>     | Whether loopback is enabled on a SONET/SDH interface, and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                         | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16-bit</b> .                                                                    | All levels                   |
| <b>Payload scrambler</b>  | Whether payload scrambling is enabled.                                                                                                                                    | All levels                   |
| <b>Parent</b>             | Name and interface index of the interface to which a particular child interface belongs. <b>None</b> indicates that this interface is the top level.                      | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .    | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .              | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                       | <b>detail extensive</b>      |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output       |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>ANSI or ITU LMI settings</b> | <p>(Frame Relay) Settings for Local Management Interface (LMI). The format is (ANSI or ITU) LMI settings: <i>value, value... nn</i> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li>• <b>n391dte</b>—DTE full status polling interval (1–255)</li> <li>• <b>n392dce</b>—DCE error threshold (1–10)</li> <li>• <b>n392dte</b>—DTE error threshold (1–10)</li> <li>• <b>n393dce</b>—DCE monitored event count (1–10)</li> <li>• <b>n393dte</b>—DTE monitored event count (1–10)</li> <li>• <b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li>• <b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul>                                     | All levels            |
| <b>LMI statistics</b>           | <p>(Frame Relay) Statistics about the link management.</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last sent hh:mm:ss ago)</b>.</li> <li>• <b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                              | detail extensive      |
| <b>DTE statistics</b>           | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE):</p> <ul style="list-style-type: none"> <li>• <b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li>• <b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li>• <b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li>• <b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                            | detail extensive none |
| <b>DCE statistics</b>           | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li>• <b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li>• <b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li>• <b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li>• <b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                                   | detail extensive none |
| <b>Common statistics</b>        | <p>(Frame Relay) Statistics about messages sent between the DTE and the DCE:</p> <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See LMI settings.)</li> </ul> | detail extensive none |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Nonmatching DCE-end DLCIs</b>        | (Frame Relay) Number of DLCIs configured from the DCE, displayed only from the DTE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Last flapped</b>                     | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: <i>year-month-day hh:mm:ss timezone year-month-day (hh:mm:ss ago)</i></b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>CoS Queues</b>                       | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Statistics last cleared</b>          | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>DS1 alarms</b><br><b>DS1 defects</b> | <p>Elor T1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. See the following list for all possible alarms and defects. For complete explanations of most of these alarms and defects, see <i>Bellcore Telcordia GR-499-CORE</i>.</p> <ul style="list-style-type: none"> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul> | <b>detail extensive none</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>T1 media</b>           | <p>Counts of T1 or E1 media-specific errors.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>The T1 or E1 media-specific error types are:</p> <ul style="list-style-type: none"> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>BEE</b>—Bit error</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>FEBE</b>—Far-end block error (E1 only)</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>BES</b>—Bit error seconds</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | <b>extensive</b>        |
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Input errors</b> | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Bucket Drops</b>—Drops caused by traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is off.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value of this field increments, the PIC is malfunctioning.</li> <li>• <b>HS link FIFO overflows</b>—Number of FIFO overflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output         |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b>  | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>HS link FIFO underflows</b>—Number of FIFO underflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeds the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues</b>  | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Queue counters</b> | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Active alarms</b>  | Defects that can prevent the interface from passing packets:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |
| <b>Active defects</b> | <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>LOF</b>—Loss of frame.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |
| <b>SONET alarms</b>   | Media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels              |
| <b>SONET defects</b>  | Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SONET PHY</b> , <b>SONET section</b> , <b>SONET line</b> , and <b>SONET path</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |



Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| SONET vt      | <p>SONET virtual-tributary (VT) alarms and defects:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-V</b>—Remote error indication (near-end VT)</li> <li>• <b>LOP-V</b>—Loss of pointer (near-end VT)</li> <li>• <b>AIS-V</b>—Alarm indication signal (near-end VT)</li> <li>• <b>RDI-V</b>—Remote defect indication (near-end VT)</li> <li>• <b>UNEQ-V</b>—Unequipped (near-end VT)</li> <li>• <b>PLM-V</b>—Payload label mismatch (near-end VT)</li> <li>• <b>ES-V</b>—Errored seconds (near-end VT)</li> <li>• <b>SES-V</b>—Severely errored seconds (near-end VT)</li> <li>• <b>UAS-V</b>—Unavailable seconds (near-end VT)</li> <li>• <b>ES-VFE</b>—Errored seconds (far-end VT)</li> <li>• <b>SES-VFE</b>—Severely errored seconds (far-end VT)</li> <li>• <b>UAS-VFE</b>—Unavailable seconds (far-end VT)</li> </ul> | extensive       |
| SONET PHY     | <p>Counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | extensive       |
| SONET section | <p>Counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       | extensive       |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET line</b> | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul>      | <b>extensive</b> |
| <b>SONET path</b> | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>ES-PFE</b>—Errored seconds (far-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Received SONET overhead    | Values of the received and transmitted SONET/SDH overhead:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | extensive       |
| Transmitted SONET overhead | <p>F1—Section user channel byte. This byte is set aside for the purposes of users.</p> <p>S1—Synchronization Status (S1). The S1 byte is located in the first STS-1 of an STS-N. Bits 5 through 8 convey the synchronization status of the network element.</p> <p>Z3 and Z4—Path overhead.</p> <p>V5—Virtual Tributary (VT) path overhead byte.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |
| SDH alarms                 | SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: SDH PHY, SDH regenerator section, SDH multiplex section, and SDH path.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels      |
| SDH defects                | <p><b>NOTE:</b> For controller based SONET PICs, the SDH alarms and SDH defects output in the <b>show interface coc3 extensive</b> command output only shows the section and line level defects. The path level defects can be found under the SONET (so) interface output.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| SDH PHY                    | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                     | extensive       |
| SDH regenerator section    | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>RS-BIP8</b>—24-bit BIP for multiplex section overhead (B2 bytes)</li> <li>• <b>OOF</b>—Out of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>RS-ES</b>—Errored seconds (near-end regenerator section)</li> <li>• <b>RS-SES</b>—Severely errored seconds (near-end regenerator section)</li> <li>• <b>RS-SEFS</b>—Severely errored framing seconds (regenerator section)</li> </ul> | extensive       |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH multiplex section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>MS-BIP24</b>—8-bit BIP for high-order path overhead (B3 byte)</li> <li>• <b>MS-FEBE</b>—Far-end block error (multiplex section)</li> <li>• <b>MS-FERF</b>—Far-end remote fail (multiplex section)</li> <li>• <b>MS-AIS</b>—alarm indication signal (multiplex section)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>MS-ES</b>—Errored seconds (near-end multiplex section)</li> <li>• <b>MS-SES</b>—Severely errored seconds (near-end multiplex section)</li> <li>• <b>MS-UAS</b>—Unavailable seconds (near-end multiplex section)</li> <li>• <b>MS-ES-FE</b>—Errored seconds (far-end multiplex section)</li> <li>• <b>MS-SES-FE</b>—Severely errored seconds (far-end multiplex section)</li> <li>• <b>MS-UAS-FE</b>—Unavailable seconds (far-end multiplex section)</li> </ul>                               | <b>extensive</b> |
| <b>SDH path</b>              | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>HP-BIP8</b>—8-bit BIP for regenerator section overhead (B1 byte)</li> <li>• <b>HP-FEBE</b>—Far-end block error (high-order path)</li> <li>• <b>HP-LOP</b>—Loss of pointer (high-order path)</li> <li>• <b>HP-AIS</b>—High-order-path alarm indication signal</li> <li>• <b>HP-FERF</b>—Far-end remote fail (high-order path)</li> <li>• <b>HP-UNEQ</b>—Unequipped (high-order path)</li> <li>• <b>HP-PLM</b>—Payload label mismatch (high-order path)</li> <li>• <b>HP-ES</b>—Errored seconds (near-end high-order path)</li> <li>• <b>HP-SES</b>—Severely errored seconds (near-end high-order path)</li> <li>• <b>HP-UAS</b>—Unavailable seconds (near-end high-order path)</li> <li>• <b>HP-ES-FE</b>—Errored seconds (far-end high-order path)</li> <li>• <b>HP-SES-FE</b>—Severely errored seconds (far-end high-order path)</li> <li>• <b>HP-UAS-FE</b>—Unavailable seconds (far-end high-order path)</li> </ul> | <b>extensive</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Received SDH overhead    | Values of the received and transmitted SONET overhead:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | extensive       |
| Transmitted SDH overhead | <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3</b> and <b>Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
| Received path trace      | Channelized OC12 interfaces allow path trace bytes to be sent inband across the SONET/SDH link. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits. This information is specific to each of the 12 channelized OC12 interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | extensive       |
| Transmitted path trace   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |
| DS3 media                | <p>Counts of T3 media-specific errors. For detailed definitions of the T3 (DS-3) error events (BPV, EXZ, LCV, PCV, and CCV) and performance parameters (LES, PES, PSES, CES, CSES, SEFS, and UAS), see RFC 2496.</p> <p>The DS3 or E3 media-specific error types can be:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop out of lock</li> <li>• <b>Reframing</b>—Frame alignment recovery time</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>IDLE</b>—Idle code detected</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—(DS3 only) Pulse code violation</li> <li>• <b>CCV</b>—(DS3 only) C-bit coding violation</li> <li>• <b>FEBE</b>—(DS3 only) Far-end block error</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>PES</b>—(DS3 only) P-bit errored seconds</li> <li>• <b>PSES</b>—(DS3 only) P-bit errored seconds (section)</li> <li>• <b>CES</b>—(DS3 only) C-bit errored seconds</li> <li>• <b>CSES</b>—(DS3 only) C-bit severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | extensive       |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>HDLC configuration</b>        | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Line encoding</b>—Line encoding used. It is always <b>HDB3</b>.</li> <li>• <b>Byte encoding</b>—(T1 only) Byte encoding used: <b>Nx64K</b> or <b>Nx56K</b>.</li> <li>• <b>Line encoding</b>—Line encoding used. For T1, the value can be <b>B8ZS</b> or <b>AMI</b>. For E1, the value is <b>HDB3</b>.</li> <li>• <b>Data inversion</b>—HDLC data inversion setting: <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Idle cycle flag</b>—Idle cycle flags.</li> <li>• <b>Start end flag</b>—Start and end flag.</li> </ul>                                                                                                                            | <b>extensive</b>             |
| <b>Interface transmit queues</b> | <p>Name of the transmit queues and their associated statistics for each DS3 channel on the Channelized OC12 PIC.</p> <ul style="list-style-type: none"> <li>• <b>B/W</b>—Queue bandwidth as a percentage of the total interface bandwidth.</li> <li>• <b>WRR</b>—Weighted round-robin (in percent).</li> <li>• <b>Packets</b>—Number of packets transmitted.</li> <li>• <b>Bytes</b>—Number of bytes transmitted.</li> <li>• <b>Drops</b>—Number of packets dropped.</li> <li>• <b>Errors</b>—Number of packet errors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>DSU configuration</b>         | <p>Information about the DSU configuration. The last three lines (<b>Bit count</b>, <b>Error bit count</b>, and <b>LOS information</b>) are displayed only if a BERT has ever been run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>Compatibility mode</b>—CSU/DSU compatibility mode: <b>None</b>, <b>Larscom</b>, <b>Kentrox</b>, or <b>Digital-Link</b>.</li> <li>• <b>Scrambling</b>—Payload scrambling. It can be <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Subrate</b>—Configured subrate setting. Applies only when <b>Digital-Link</b> compatibility mode is used. It can be <b>Disabled</b> or display units in kbps.</li> <li>• <b>FEAC loopback</b>—(T3) Whether a far-end alarm and control (FEAC) loopback is <b>Active</b> or <b>Inactive</b>. This feature is used to send alarm or status information from the far-end terminal back to the near-end terminal and to initiate T3 loopbacks at the far-end terminal from the near-end terminal.</li> <li>• <b>Response</b>—Whether the FEAC signal is <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Count</b>—Number of FEAC loopbacks.</li> </ul> | <b>extensive</b>             |
| <b>BERT configuration</b>        | <p>(DS interfaces) BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Packet Forwarding Engine configuration</b> | Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>CoS information</b>                        | Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Index</b>                                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Flags</b>                                  | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Traffic statistics</b>                     | Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize. <ul style="list-style-type: none"> <li>• <b>Input rate</b>—Rate of bits and packets received on the interface.</li> <li>• <b>Output rate</b>—Rate of bits and packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Local statistics</b>                       | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |

Table 51: Channelized OC show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b> | Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Protocol</b>           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Multilink bundle</b>   | (If the logical interface is configured as part of a multilink bundle.) Interface name for the multilink bundle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Addresses, Flags</b>   | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Destination</b>        | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Local</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Broadcast</b>          | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>DLCI</b>               | (Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b> , <b>Total down time</b> , <b>Last down</b> , and <b>Traffic statistics</b> . <b>Flags</b> is one or more of the following: <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>Dce-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b>    | (Frame Relay) Data-link connection identifier (DLCI) statistics. <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |

## Sample Output

### show interfaces extensive (Channelized OC3 IQ) (Physical)

```

user@host> show interfaces extensive coc3-0/0/0
Physical interface: coc3-0/0/0, Enabled, Physical link is Down
Interface index: 128, SNMP ifIndex: 22, Generation: 11

```



```

Description: pink coc3-0/0/0
Link-level type: Controller, Clocking: Internal, SONET mode, Speed: OC3,
Loopback: None, Parent: None
Device flags : Present Running Down
Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 4 supported
Last flapped : 2005-01-27 16:39:21 PST (1w0d 22:09 ago)
Statistics last cleared: Never
SONET alarms : PLL, LOS
SONET defects : PLL, LOF, LOS, SEF, AIS-L
SONET PHY:
 Seconds Count State
 PLL Lock 681767 1 PLL Lock Error
 PHY Light 0 0 OK
SONET section:
 BIP-B1 0 0
 SEF 681767 1 Defect Active
 LOS 681767 1 Defect Active
 LOF 681767 1 Defect Active
 ES-S 681767
 SES-S 681767
 SEFS-S 681767
SONET line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 681767 1 Defect Active
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 ES-L 681767
 SES-L 681767
 UAS-L 681757
 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
Received SONET overhead:
 F1 : 0x00, J0 : 0x00, K1 : 0xff, K2 : 0xff
 S1 : 0xff
Transmitted SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00

```

#### show interfaces extensive (Channelized OC1 on Channelized OC3 IQ)

```

user@host> show interfaces extensive coc1-0/0/0:1
Physical interface: coc1-0/0/0:1, Enabled, Physical link is Down
Interface index: 133, SNMP ifIndex: 27, Generation: 16
Link-level type: Controller, Clocking: Internal, SONET mode, Speed: 51840kbps,

 Loopback: None, Parent: coc3-0/0/0
Interface index 128
Device flags : Present Running Down 16384
Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 4 supported
Last flapped : 2005-02-04 14:51:07 PST (00:00:35 ago)
Statistics last cleared: Never
SONET alarms : None
SONET defects : AIS-P

```

```

SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 36 1 Defect Active
 RDI-P 0 0 OK
 UNEQ-P 0 0 OK
 PLM-P 0 0 OK
 ES-P 36
 SES-P 36
 UAS-P 26
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Received SONEt overhead:
 C2 : 0xff, C2(cmp) : 0x01, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONEt overhead:
 C2 : 0x01, F2 : 0x00, Z3 : 0x00, Z4 : 0x00
Received path trace:
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted path trace: router-1 coc1-0/0/0:1
 6b 61 76 65 72 69 20 63 6f 63 31 2d 30 2f 30 2f router-1 coc1-0/0/0:1
 30 3a 31 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)

```

### show interfaces extensive (Channelized T1 on Channelized OC3 IQ)

```

user@host> show interfaces extensive ct1-0/0/0:1:1
Physical interface: ct1-0/0/0:1:1, Enabled, Physical link is Down
 Interface index: 134, SNMP ifIndex: 62, Generation: 17
 Link-level type: Controller, Clocking: Internal, Speed: T1, Loopback: None,
 Framing: ESF, Parent: coc1-0/0/0:1 Interface index 133
 Device flags : Present Running Down 16384
 Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
 Link flags : None
 Hold-times : Up 0 ms, Down 0 ms
 CoS queues : 4 supported
 Last flapped : 2005-02-04 14:54:35 PST (00:00:18 ago)
 Statistics last cleared: Never
 DS1 alarms : None
 DS1 defects : AIS, LOF
T1 media:
 Seconds Count State
 SEF 1 1 OK
 BEE 1 1 OK
 AIS 18 1 Defect Active
 LOF 18 1 Defect Active
 LOS 0 0 OK
 YELLOW 0 0 OK
 BPV 0 0
 EXZ 0 0
 LCV 0 0
 PCV 0 0
 CS 0 0
 LES 18

```

```

ES 18
SES 18
SEFS 18
BES 0
UAS 14
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
SONET alarms : None
SONET defects : None
SONET vt:
 BIP-BIP2 0 0
 REI-V 0 0
 LOP-V 0 0 OK
 AIS-V 19 1 Defect Active
 RDI-V 19 1 Defect Active
 UNEQ-V 0 0 OK
 PLM-V 19 1 Defect Active
 ES-V 19
 SES-V 19
 UAS-V 9
 ES-VFE 0
 SES-VFE 0
 UAS-VFE 0
Received SONET overhead:
 V5 : 0x07, V5(cmp) : 0x02
Transmitted SONET overhead:
 V5 : 0x02
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)

```

#### show interfaces extensive (DS0 on Channelized OC3 IQ)

```

user@host> show interfaces extensive ds-0/0/0:1:1
Physical interface: ds-0/0/0:1:1:1, Enabled, Physical link is Down
Interface index: 135, SNMP ifIndex: 63, Generation: 18
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 320kbps,
Loopback: None, FCS: 16, Parent: ct1-0/0/0:1:1 Interface index 134
Device flags : Present Running
Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 4 supported
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets : 0 0 pps
Output packets: 0 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
Resource errors: 0
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 0 0 0

```

|                |   |   |   |
|----------------|---|---|---|
| 1 expedited-fo | 0 | 0 | 0 |
| 2 assured-forw | 0 | 0 | 0 |
| 3 network-cont | 0 | 0 | 0 |

## HDLC configuration:

Giant threshold: 1514, Runt threshold: 2

Timeslots : 1-5

Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,  
Start end flag: shared

## DS0 BERT configuration:

BERT time period: 10 seconds, Elapsed: 0 seconds

Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)

## Packet Forwarding Engine configuration:

Destination slot: 0, PLP byte: 4 (0x00)

## show interfaces (Channelized STM1 IQ)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces (<i>type-fpc/pic/port</i> &lt;:<i>channel</i>&gt;&lt;:<i>channel</i>&gt;)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;descriptions&gt;</code><br><code>&lt;media&gt;</code><br><code>&lt;snmp-index <i>snmp-index</i>&gt;</code><br><code>&lt;statistics&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized STM1 IQ interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b><i>type-fpc/pic/port:channel:channel</i></b>—Interface type with optional corresponding channel levels. The interface type can be one of the following types:</p> <ul style="list-style-type: none"> <li>• <b><i>type-fpc/pic/port:channel</i></b>—For the physical channelized STM1 IQ interface, <b><i>type</i></b> is <b>cstm1</b>. For the clear channel, <b><i>type</i></b> is <b>so</b>. For channelization, the STM1 IQ interface must be converted to interface type <b>cau4</b>.</li> <li>• <b><i>type-fpc/pic/port:channel</i></b>—At the first level of channelization, <b><i>type</i></b> can be <b>ce1</b> or <b>e1</b> ( clear channel or fractional channel from <b>cau4</b>).</li> <li>• <b><i>type-fpc/pic/port:channel:channel</i></b>—At the second level of channelization, <b><i>type</i></b> is <b>ds</b> (from <b>ce1</b>).</li> </ul> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show interfaces (Channelized STM1 IQ) (Physical) on page 1083</a><br><a href="#">show interfaces (Channelized AU-4) (Physical) on page 1084</a><br><a href="#">show interfaces (Channelized E1) (Physical) on page 1084</a><br><a href="#">show interfaces (DS) on page 1085</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | See the output field table for the <a href="#">show interfaces (Channelized STM1)</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### show interfaces (Channelized STM1 IQ) (Physical)

```
user@host> show interfaces cstm1-0/0/0
```

```

Physical interface: cstm1-0/0/0, Enabled, Physical link is Up
Interface index: 146, SNMP ifIndex: 35
Link-level type: Frame-relay, Controller, Clocking: Internal, SDH mode,
Speed: OC3, Loopback: None, Parent: None Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
Nonmatching DCE-end DLCIs:
 2
Last flapped : 2003-02-06 15:01:56 PST (07:15:06 ago)
...

```

#### show interfaces (Channelized AU-4) (Physical)

```

user@host> show interfaces cau4-0/0/0
Physical interface: cau4-0/0/0, Enabled, Physical link is Up
Interface index: 147, SNMP ifIndex: 36
Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
Loopback: None, Parent: cstm1-0/0/0 Interface index 146
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : None
Last flapped : 2003-02-06 19:36:31 PST (02:40:42 ago)
SDH alarms : None
SDH defects : None
...

```

#### show interfaces (Channelized E1) (Physical)

```

user@host> show interfaces ce1-0/0/0:11
Physical interface: ce1-0/0/0:11, Enabled, Physical link is Up
Interface index: 169, SNMP ifIndex: 288
Link-level type: Frame-relay, Controller, Clocking: Internal, Speed: E1,
Loopback: None, Framing: G704, Parent: cau4-0/0/0 Interface index 147
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:

```

```

 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
Nonmatching DCE-end DLCIs:
 2
Last flapped : 2003-02-06 22:05:23 PST (00:13:45 ago)
DS1 alarms : None
DS1 defects : None
SDH alarms : None
SDH defects : None
...

```

### show interfaces (DS)

```

user@host> show interfaces ds-0/0/0:11:1
Physical interface: ds-0/0/0:11:1, Enabled, Physical link is Up
 Interface index: 170, SNMP ifIndex: 289
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
 Loopback: Illegal, FCS: 16, Parent: ce1-0/0/0:11 Interface index 169
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives
 CoS Queues: 8 maximum usable queues, 4 in use
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 0 (never), Output: 0 (never)
 LCP state: Conf-req-sent
 Egress queues: 8 supported, 4 in use
...
Logical interface ds-0/0/0:11:1.0 (Index 77) (SNMP ifIndex 290)
 Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
 Bandwidth: 0
 Protocol inet, MTU: 1500
 Flags: Protocol-Down
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.134.1.0/30, Local: 10.134.1.1
DLCI 100
 Flags: Active, Dce-configured
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
...

```

## show interfaces (Channelized STM1)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces e1-fpc/pic/port:elchannel</code><br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized STM1 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><code>e1-fpc/pic/port:elchannel</code>—Display standard status information about the specified channelized STM1 interface.</p> <p><code>brief   detail   extensive   terse</code>—(Optional) Display the specified level of output.</p> <p><code>descriptions</code>—(Optional) Display interface description strings.</p> <p><code>media</code>—(Optional) Display media-specific information about network interfaces.</p> <p><code>snmp-index <i>snmp-index</i></code>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><code>statistics</code>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (Channelized STM1, SDH) on page 1097</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | <a href="#">Table 52 on page 1086</a> lists the output fields for the <b>show interfaces</b> (all Channelized STM1 interfaces) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 52: Channelized STM1 show interfaces Output Fields

| Field Name                | Field Description                                                                                                                                           | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                             |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                             | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                              | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                           | <b>detail extensive</b>      |



Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Clocking</b>           | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Framing</b>            | Physical layer framing format used on the link. It can be <b>G704</b> , <b>G704-NO-CRC4</b> , or <b>Unframed</b> . The default is <b>G704</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Parent</b>             | (Channelized STM1 IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. <b>None</b> indicates that this interface is the top level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the "Device Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the "Interface Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the "Link Flags" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Keepalive settings</b> | (PPP and HDLC) Configured settings for keepalives. <ul style="list-style-type: none"> <li><b>intervalseconds</b>—The time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li><b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li><b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | <b>detail extensive none</b> |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output              |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Keepalive statistics</b>                  | <p>(PPP and HDLC) Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul> | <b>detail extensive none</b> |
| <b>ANSI LMI settings or ITU LMI settings</b> | <p>(Frame Relay) Local Management Interface settings. The format is <b>(ANSI or ITU) LMI settings: value, value...xx</b> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li><b>n391dte</b>—DTE full status polling interval (1- 255)</li> <li><b>n392dce</b>—DCE error threshold (1-10)</li> <li><b>n392dte</b>—DTE error threshold (1-10)</li> <li><b>n393dce</b>—DCE monitored event count (1-10)</li> <li><b>n393dte</b>—DTE monitored event count (1-10)</li> <li><b>t391dte</b>—DTE polling timer (5-30 seconds)</li> <li><b>t392dce</b>—DCE polling verification timer (5-30 seconds)</li> </ul>              | <b>detail extensive none</b> |
| <b>LMI</b>                                   | <p>(Frame Relay) Statistics about the link management.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li><b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last seen hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                   | <b>detail extensive none</b> |
| <b>DTE statistics</b>                        | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE):</p> <ul style="list-style-type: none"> <li><b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li><b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li><b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li><b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                     | <b>detail extensive none</b> |
| <b>DCE statistics</b>                        | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li><b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li><b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li><b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li><b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                            | <b>detail extensive none</b> |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                                                                                                           | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay, displayed only from the DTE) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>LCP state</b>                 | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>NCP state</b>                 | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>CHAP state</b>                | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value of this field increments, the PIC is malfunctioning.</li> </ul> | <b>extensive</b>        |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                    | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> </ul> | <b>extensive</b>             |
| <b>DS1 alarms</b><br><b>DS1 defects</b> | <p>E1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see <i>Bellcore Telcordia GR-499-CORE</i>.</p> <ul style="list-style-type: none"> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>SDH alarms</b><br><b>SDH defects</b> | <p>SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: SDH PHY, SDH regenerator section, SDH multiplex section, and SDH path.</p> <p><b>NOTE:</b> For controller-based SONET PICs, the SDH alarms and SDH defects output in the <b>show interface cstm1 extensive</b> command output only shows the section and line level defects. The path level defects can be found under the SONET (so) interface output.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>All levels</b>            |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| E1 media                  | <p>Active alarms and defects, plus counts of specific E1 errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Error types can be:</p> <ul style="list-style-type: none"> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>BEE</b>—Bit error</li> <li>• <b>BES</b>—Bit error seconds</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>FEBE</b>—Far-end block error</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> </ul> | extensive       |
| Interface transmit queues | <p>Names of the transmit queues and their associated statistics for each E1 channel on the Channelized STM1-to-E1 PIC.</p> <ul style="list-style-type: none"> <li>• <b>B/W</b>—Queue bandwidth as a percentage of the total interface bandwidth.</li> <li>• <b>WRR</b>—Weighted round-robin (in percent).</li> <li>• <b>Packets</b>—Number of packets transmitted.</li> <li>• <b>Bytes</b>—Number of bytes transmitted.</li> <li>• <b>Drops</b>—Number of packets dropped.</li> <li>• <b>Errors</b>—Number of packet errors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | extensive       |
| HDLC configuration        | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Line encoding</b>—Line encoding used. It is always <b>HDB3</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | extensive       |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>DS1 BERT configuration</b>  | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>SDH PHY</b>                 | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>             |
| <b>SDH regenerator section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>RS-BIP8</b>—24-bit BIP for multiplex section overhead (B2 bytes)</li> <li>• <b>OOF</b>—Out of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>RS-ES</b>—Errored seconds (near-end regenerator section)</li> <li>• <b>RS-SES</b>—Severely errored seconds (near-end regenerator section)</li> <li>• <b>RS-SEFS</b>—Severely errored framing seconds (regenerator section)</li> </ul> | <b>extensive</b>             |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH multiplex section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>MS-BIP24</b>—8-bit BIP for high-order path overhead (B3 byte)</li> <li>• <b>MS-FEBE</b>—Far-end block error (multiplex section)</li> <li>• <b>MS-FERF</b>—Far-end remote fail (multiplex section)</li> <li>• <b>MS-AIS</b>—alarm indication signal (multiplex section)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>MS-ES</b>—Errored seconds (near-end multiplex section)</li> <li>• <b>MS-SES</b>—Severely errored seconds (near-end multiplex section)</li> <li>• <b>MS-UAS</b>—Unavailable seconds (near-end multiplex section)</li> <li>• <b>MS-ES-FE</b>—Errored seconds (far-end multiplex section)</li> <li>• <b>MS-SES-FE</b>—Severely errored seconds (far-end multiplex section)</li> <li>• <b>MS-UAS-FE</b>—Unavailable seconds (far-end multiplex section)</li> </ul>                               | <b>extensive</b> |
| <b>SDH path</b>              | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>HP-BIP8</b>—8-bit BIP for regenerator section overhead (B1 byte)</li> <li>• <b>HP-FEBE</b>—Far-end block error (high-order path)</li> <li>• <b>HP-LOP</b>—Loss of pointer (high-order path)</li> <li>• <b>HP-AIS</b>—High-order-path alarm indication signal</li> <li>• <b>HP-FERF</b>—Far-end remote fail (high-order path)</li> <li>• <b>HP-UNEQ</b>—Unequipped (high-order path)</li> <li>• <b>HP-PLM</b>—Payload label mismatch (high-order path)</li> <li>• <b>HP-ES</b>—Errored seconds (near-end high-order path)</li> <li>• <b>HP-SES</b>—Severely errored seconds (near-end high-order path)</li> <li>• <b>HP-UAS</b>—Unavailable seconds (near-end high-order path)</li> <li>• <b>HP-ES-FE</b>—Errored seconds (far-end high-order path)</li> <li>• <b>HP-SES-FE</b>—Severely errored seconds (far-end high-order path)</li> <li>• <b>HP-UAS-FE</b>—Unavailable seconds (far-end high-order path)</li> </ul> | <b>extensive</b> |



Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| SDH tu                                 | <p>Active alarms and defects, plus counts of specific SDH tributary unit (TU) errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>TU-BIP-2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>TU-FEBE</b>—(near-end TU)</li> <li>• <b>TU-LOP</b>—Loss of pointer (near-end TU)</li> <li>• <b>TU-AIS</b>—Alarm indication signal (near-end TU)</li> <li>• <b>TU-FERF</b>—(near-end TU)</li> <li>• <b>TU-UNEQ</b>—Unequipped (near-end TU)</li> <li>• <b>TU-PLM</b>—Payload label mismatch (near-end TU)</li> <li>• <b>TU-ES</b>—Errored seconds (near-end TU)</li> <li>• <b>TU-SES</b>—Severely errored seconds (near-end TU)</li> <li>• <b>TU-UAS</b>—Unavailable seconds (near-end TU)</li> <li>• <b>TU-ES-FE</b>—Errored seconds (far-end TU)</li> <li>• <b>TU-SES-FE</b>—Severely errored seconds (far-end TU)</li> <li>• <b>TU-UAS-FE</b>—Unavailable seconds (far-end TU)</li> </ul> | extensive       |
| Received SDH overhead                  | Values of the received and transmitted SONET overhead:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |
| Transmitted SDH overhead               | <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i> signal.</li> <li>• <b>Z3</b> and <b>Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               |                 |
| Received path trace                    | Channelized OC12 interfaces allow path trace bytes to be sent inband across the SONET/SDH link. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits. This information is specific to each of the 12 channelized OC12 interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | extensive       |
| Transmitted path trace                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | extensive       |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>   | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Enabled</b>           | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Index</b>             | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>      | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Encapsulation</b>     | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Protocol</b>          | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Route table</b>       | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>  | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |

Table 52: Channelized STM1 show interfaces Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Destination</b>     | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Local</b>           | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Broadcast</b>       | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>DLCI</b>            | <p>(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b>, <b>Total down time</b>, <b>Last down</b>, and <b>Traffic statistics</b>. <b>Flags</b> is one or more of the following:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>Dce-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b> | <p>(Frame Relay) Data-link connection identifier (DLCI) statistics.</p> <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |

## Sample Output

### show interfaces extensive (Channelized STM1, SDH)

```

user@host> show interfaces e1-1/0/0:1 extensive
Physical interface: e1-1/0/0:1, Enabled, Physical link is Up
Interface index: 148, SNMP ifIndex: 285, Generation: 2915
Link-level type: Frame-relay, MTU: 1504, SDH mode, Speed: E1, Loopback: None,
FCS: 16, Framing: G704
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
Nonmatching DCE-end DLCIs:

```

```

2
Hold-times : Up 0 ms, Down 0 ms
Last flapped : 2002-05-23 17:02:59 PDT (17:23:45 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 592 48 bps
 Output bytes : 644 48 bps
 Input packets: 46 0 pps
 Output packets: 46 0 pps
Input errors:
 Errors: 0, Drops: 9, Framing errors: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 11, L2 mismatch timeouts: 0,
 HS link CRC errors: 0, SRAM errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
DS1 alarms : None
DS1 defects : None
SDH alarms : None
SDH defects : None
E1 media:
 Seconds Count State
 SEF 0 0 OK
 BEE 0 0 OK
 AIS 124 1 OK
 LOF 124 1 OK
 LOS 0 0 OK
 YELLOW 0 0 OK
 BPV 0 0
 EXZ 0 0
 LCV 0 0
 PCV 0 0
 CS 0 0
 FEBE 0 0
 LES 124
 ES 125
 SES 124
 SEFS 124
 BES 0
 UAS 37
Interface transmit queues:
 B/W WRR Packets Bytes Drops Errors
Queue0 95 95 0 0 0 0
Queue1 5 5 529 6348 0 0
HDLC configuration:
 Giant threshold: 0, Runt threshold: 0
 Timeslots : All active
 Line encoding: HDB3
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
SDH PHY:
 Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 0 0 OK
SDH regenerator section:
 RS-BIP8 0 0
 OOF 125 1 OK
 LOS 125 1 OK
 LOF 125 1 OK
 RS-ES 125
 RS-SES 125
 RS-SEFS 125
SDH multiplex section:

```

```

MS-BIP24 0 0
MS-FEBE 0 0
MS-FERF 0 0 OK
MS-AIS 125 1 OK
BERR-SF 0 0 OK
BERR-SD 0 0 OK
MS-ES 125
MS-SES 125
MS-UAS 115
MS-ES-FE 0
MS-SES-FE 0
MS-UAS-FE 0
SDH path:
HP-BIP8 0 0
HP-FEBE 0 0
HP-LOP 0 0 OK
HP-AIS 125 1 OK
HP-FERF 0 0 OK
HP-UNEQ 0 0 OK
HP-PLM 125 1 OK
HP-ES 125
HP-SES 125
HP-UAS 115
HP-ES-FE 0
HP-SES-FE 0
HP-UAS-FE 0
SDH tu:
TU-BIP2 0 0
TU-FEBE 124 1
TU-LOP 0 0 OK
TU-AIS 124 1 OK
TU-FERF 124 1 OK
TU-UNEQ 0 0 OK
TU-PLM 124 1 OK
TU-ES 125
TU-SES 125
TU-UAS 115
TU-ES-FE 0
TU-SES-FE 0
TU-UAS-FE 0
Received SDH overhead:
F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x02, C2(cmp) : 0x02, F2 : 0x00
Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00, V5 : 0x02
V5(cmp) : 0x02
Transmitted SDH overhead:
F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x02, F2 : 0x00, Z3 : 0x00
Z4 : 0x00, V5 : 0x02
Received path trace:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted path trace:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Packet Forwarding Engine configuration:
 Destination slot: 1, PLP byte: 2 (0x07)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 1945600 95 0 low none
3 network-control 5 102400 5 0 low none
Logical interface e1-1/0/0:1.0 (Index 10) (SNMP ifIndex 369) (Generation 496)

```

```

Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 575, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 19.19.19.3, Local: 19.19.19.4, Broadcast: Unspecified,
 Generation: 975
DLCI 100
 Flags: Active, Dce-configured
 Total down time: 0 sec, Last down: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
DLCI statistics:
 Active DLCI :2 Inactive DLCI : 0

```

## show interfaces (Channelized T1 IQ)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show interfaces (ct1-fpc/pic/port   type-fpc/pic/port<:channel><:channel>)<br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized T1 IQ interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>type-fpc/pic/port:channel</b>—Interface type. With optional corresponding channel levels, the interface type can be one of the following:</p> <ul style="list-style-type: none"> <li><b>type-fpc/pic/port</b>—For the physical channelized T1 IQ interface, <b>type</b> is <b>ct1</b>.</li> <li><b>type-fpc/pic/port:channel</b>—For the clear channel, <b>type</b> is <b>t1</b>. At the first level of channelization, <b>type</b> can be <b>ct1</b> or <b>t1</b>.</li> <li><b>type-fpc/pic/port:channel:channel</b>—At the second level of channelization, <b>type</b> can be <b>ds</b>.</li> </ul> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive (CT1) on page 1109</a><br><a href="#">show interfaces extensive (T1) on page 1110</a><br><a href="#">show interfaces extensive (DS0) on page 1111</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>            | Table 53 on page 1101 lists the output fields for the <b>show interfaces</b> (Channelized T1 IQ and T3 IQ interfaces) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields

| Field Name         | Field Description               | Level of Output |
|--------------------|---------------------------------|-----------------|
| Physical Interface |                                 |                 |
| Physical interface | Name of the physical interface. | All levels      |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>Clocking</b>           | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| <b>Framing</b>            | Physical layer framing format used on the link. It can be <b>ESF</b> or <b>SF</b> . The default is <b>ESF</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Parent</b>             | Name and interface index of the interface to which a particular child interface belongs. <b>None</b> indicates that this interface is the top level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Keepalive settings</b> | Configured settings for keepalives. <ul style="list-style-type: none"> <li><b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li><b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li><b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | <b>detail extensive</b> none |



Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output       |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Keepalive statistics | <p>Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li>(<b>last seen 00:00:00 ago</b>)—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li>(<b>last seen 00:00:00 ago</b>)—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul>                                                                                                                 | detail extensive none |
| LMI settings         | <p>(Frame Relay) Settings for Local Management Interface (LMI) can be either <b>ANSI LMI settings</b> or <b>ITU LMI settings</b>. ANSI LMI settings is the default. The format is (ANSI or ITU) <b>LMI settings: value, value... xx seconds</b>, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li><b>n391dte</b>—DTE full status polling interval (1–255)</li> <li><b>n392dce</b>—DCE error threshold (1–10)</li> <li><b>n392dte</b>—DTE error threshold (1–10)</li> <li><b>n393dce</b>—DCE monitored event count (1–10)</li> <li><b>n393dte</b>—DTE monitored event count (1–10)</li> <li><b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li><b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | detail extensive none |
| LMI                  | <p>(Frame Relay) LMI packet statistics:</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li><b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                                                                                   | detail extensive none |
| DTE statistics       | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communication equipment (DCE):</p> <ul style="list-style-type: none"> <li><b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li><b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li><b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li><b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                                                                                            | detail extensive none |
| DCE statistics       | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li><b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li><b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li><b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li><b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                                                                                             | detail extensive none |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | <p>(Frame Relay) Statistics about messages sent between the DTE and the DCE:</p> <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                                                                                                                  | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay) Number of DLCIs configured from the DCE, displayed only from the DTE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>LCP state</b>                 | <p>(PPP) Link Control Protocol state.</p> <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>NCP state</b>                 | <p>(PPP) Network Control Protocol state.</p> <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>CHAP state</b>                | <p>(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction.</p> <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the <b>Success</b> state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| CoS queues              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive none |
| Statistics last cleared | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | detail extensive      |
| Traffic statistics      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail extensive      |
| Input errors            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Counter increments when the software could not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Count of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Count of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value in this field increments, the PIC is malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | extensive             |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output              |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>          | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly, (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeds the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Queue counters</b>         | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>DS1 alarms DS1 defects</b> | <p>Media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface.</p> <ul style="list-style-type: none"> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>T1 media</b>           | <p>Counts of T1 media-specific errors.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>The T1 media-specific error types can be:</p> <ul style="list-style-type: none"> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>BEE</b>—Bit error event</li> <li>• <b>BES</b>—Bit error seconds</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>FEBE</b>—Far-end block error</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>SEFS</b>—Severely errored framing seconds (section)</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> </ul> | <b>extensive</b> |
| <b>Line encoding</b>      | Line encoding used: <b>B8ZS</b> or <b>AMI</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels       |
| <b>Buildout</b>           | Buildout setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels       |
| <b>HDLC configuration</b> | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Line encoding</b>—Line encoding used: <b>B8ZS</b> or <b>AMI</b>.</li> <li>• <b>Byte encoding</b>—Byte encoding used: <b>Nx64K</b> or <b>Nx56K</b>.</li> <li>• <b>Data inversion</b>—HDLC data inversion setting: <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Idle cycle Flag</b>—Idle cycle flags.</li> <li>• <b>Start end Flag</b>—Start and end flag.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b> |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output              |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>DSO or DS1 BERT configuration</b>          | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul> | <b>detail extensive none</b> |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                              | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Index</b>                                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the logical interface; values are described in the “Logical Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                               | <b>All levels</b>            |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>All levels</b>            |
| <b>Protocol</b>                               | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>MTU</b>                                    | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Route table</b>                            | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>                       | Information about the address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Destination</b>                            | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Local</b>                                  | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |

Table 53: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Broadcast</b>       | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>      | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>DLCI</b>            | (Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b> , <b>Total down time</b> , <b>Last down</b> , and <b>Traffic statistics</b> . <b>Flags</b> is one or more of the following: <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>Dce-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b> | (Frame Relay) Data-link connection identifier (DLCI) statistics. <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |

## Sample Output

### show interfaces extensive (CT1)

```

user@host> show interfaces extensive ct1-0/1/1
Physical interface: ct1-0/1/1, Enabled, Physical link is Up
 Interface index: 145, SNMP ifIndex: 32, Generation: 28
 Link-level type: Controller, Clocking: Internal, Speed: T1,
 Loopback: None, Framing: ESF, Parent: None
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps 16384
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 4 supported
Last flapped : 2005-08-17 11:47:09 PDT (1d 03:38 ago)
Statistics last cleared: 2005-08-18 15:25:37 PDT (00:00:27 ago)
DS1 alarms : None
DS1 defects : None
T1 media:
 Seconds Count State
SEF 0 0 OK
BEE 0 0 OK
AIS 0 0 OK
LOF 0 0 OK
LOS 0 0 OK
YELLOW 0 0 OK
BPV 0 0
EXZ 0 0
LCV 0 0
PCV 0 0
CS 0 0
LES 0
ES 0

```

```

SES 0
SEFS 0
BES 0
UAS 0
Line encoding: B8ZS
Buildout : 0 to 132 feet
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)

```

### show interfaces extensive (T1)

```

user@host> show interfaces extensive t1-0/2/0
Physical interface: t1-0/2/0, Enabled, Physical link is Up
 Interface index: 161, SNMP ifIndex: 33, Generation: 61
 Link-level type: PPP, MTU: 1504, Speed: T1, Loopback: None, FCS: 16,
 Parent: ct1-0/2/0 Interface index 148
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timeout : 0
Nonmatching DCE-end DLCIs:
 2
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 4 supported
Last flapped : 2005-09-07 15:43:47 PDT (00:00:06 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 14 0 bps
 Input packets : 0 0 pps
 Output packets: 1 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, L3 incompletes: 0,
 L2 channel errors: 0, L2 mismatch timeouts: 0,
 HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0,
 MTU errors: 0, Resource errors: 0
Queue counters: Queued packets Transmitted packets Dropped packets
0 best-effort 0 0 0
1 expedited-fo 0 0 0

```



```

 2 assured-forw 0 0 0
 3 network-cont 1 1 0
DS1 alarms : None
DS1 defects : None
HDLC configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 1514, Runt threshold: 2
 Timeslots : All active
 Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag:
 flags, Start end flag: shared
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 4 (0x00)

```

### show interfaces extensive (DS0)

```

user@host> show interfaces extensive ds-0/1/0:0
Physical interface: ds-0/1/0:1, Enabled, Physical link is Up
 Interface index: 157, SNMP ifIndex: 52, Generation: 46
 Link-level type: Frame-Relay, PPP, MTU: 1504, Clocking: Internal,
 Speed: 640kbps, Loopback: None, FCS:16,
 Parent: ct1-0/1/0 Interface index 143
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
DTE statistics:
 Enquiries sent : 43186
 Full enquiries sent : 8515
 Enquiry responses received : 43185
 Full enquiry responses received : 8515
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timeout : 0
Nonmatching DCE-end DLCIs:
 2
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
 Input : 8 (last seen 00:00:12 ago)
 Output: 8 (last sent 00:00:07 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured
CHAP state: Not-configured
CoS queues : 4 supported
Last flapped : 2005-08-18 15:23:46 PDT (00:03:17 ago)
Statistics last cleared: 2005-08-18 15:25:37 PDT (00:01:26 ago)
Traffic statistics:
 Input bytes : 840 0 bps
 Output bytes : 912 0 bps
 Input packets : 25 0 pps
 Output packets: 26 0 pps

```

```
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, L3 incompletes: 0,
 L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,
 Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0,
 MTU errors: 0, Resource errors: 0
Queue counters: Queued packets Transmitted packets Dropped packets
0 best-effort 0 0 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 26 26 0
HDLC configuration:
 Giant threshold: 1514, Runt threshold: 2
 Timeslots : 1-10
 Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
 Start end flag: shared
DSO BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 4 (0x00)
Logical interface ds-0/1/0:1.0 (Index 67) (SNMP ifIndex 53) (Generation 11)
 Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
 Protocol inet, MTU: 1500, Generation: 26, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 11.11.11.0/30, Local: 11.11.11.2, Broadcast: 11.11.11.3,
 Generation: 39
DLCI 100
 Flags: Active, Dce-configured
 Total down time: 0 sec, Last down: Never
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
DLCI statistics:
 Active DLCI :2 Inactive DLCI : 0
...
```

## show interfaces (Channelized T3 IQ)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces (ct3-fpc/pic/port   type-fpc/pic/port&lt;:channel&gt;&lt;:channel&gt;) &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified channelized T3 IQ interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>type-fpc/pic/port:channel</b>—Interface type. With optional corresponding channel levels, the interface type can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>type-fpc/pic/port</b>—For the physical channelized T3 IQ interface, <b>type</b> is <b>ct3</b>.</li> <li>• <b>type-fpc/pic/port:channel</b>—For the clear channel, <b>type</b> is <b>t3</b>. At the first level of channelization, <b>type</b> can be <b>ct1</b> or <b>t1</b>.</li> <li>• <b>type-fpc/pic/port:channel:channel</b>—At the second level of channelization, <b>type</b> is <b>ds</b>.</li> </ul> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces extensive (Channelized T3 IQ) (Physical) on page 1114</a></p> <p><a href="#">show interfaces extensive (Channelized T1 on Channelized T3 IQ) on page 1114</a></p> <p><a href="#">show interfaces extensive (DSO on Channelized T3 IQ) on page 1114</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | See the output field table for the <a href="#">show interfaces (Channelized T1 IQ)</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### show interfaces extensive (Channelized T3 IQ) (Physical)

```
user@host> show interfaces extensive ct3-0/0/1
Physical interface: ct3-0/0/1, Enabled, Physical link is Up
 Interface index: 30, SNMP ifIndex: 317, Generation: 29
 Link-level type: Controller, MTU: 4474, Clocking: Internal, Speed: T3,
 Loopback: None, FCS: 16, Mode: C/Bit parity, Parent: None
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : None
...
```

### show interfaces extensive (Channelized T1 on Channelized T3 IQ)

```
user@host> show interfaces extensive ct1-0/0/1:2
Physical interface: ct1-0/0/1:2, Enabled, Physical link is Up
 Interface index: 175, SNMP ifIndex: 1505, Generation: 174
 Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1,
 Loopback: None, FCS: 16, Framing: ESF, Parent: ct3-0/0/1 (Index 32)
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : None
...
```

### show interfaces extensive (DSO on Channelized T3 IQ)

```
user@host> show interfaces extensive ds-0/0/1:2:1
Physical interface: ds-0/0/1:2:1, Enabled, Physical link is Up
 Interface index: 176, SNMP ifIndex: 1563, Generation: 175
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
 Loopback: None, FCS: 16, Parent: ct1-0/0/1:2(Index 175)
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : Keepalives
...
```

## show interfaces (Discard)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces dsc &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display status information about the specified discard interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>dsc</b>—Display standard information about the specified discard interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—This option is not relevant for the discard interface and always shows a value of 0.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) This option is not relevant for the discard interface and always shows a value of 0.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show interfaces (ATM) on page 992</a></li> <li>• <a href="#">show interfaces routing</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show interfaces dsc on page 1118</a><br><a href="#">show interfaces dsc brief on page 1118</a><br><a href="#">show interfaces dsc detail on page 1118</a><br><a href="#">show interfaces dsc extensive on page 1119</a>                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | Table 54 on page 1115 lists the output fields for the <b>show interfaces</b> (discard) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 54: Discard show interfaces Output Fields

| Field Name                | Field Description                                                                                                                     | Level of Output              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                       |                              |
| <b>Physical interface</b> | Name of the physical interface, whether the interface is enabled, and the state of the physical interface: <b>Up</b> or <b>Down</b> . | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                        | <b>detail extensive none</b> |

Table 54: Discard show interfaces Output Fields (*continued*)

| Field Name                               | Field Description                                                                                                                                                                                                                                    | Level of Output               |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Generation</b>                        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                    | <b>detail extensive</b>       |
| <b>SNMP ifIndex</b>                      | SNMP index number for the physical interface.                                                                                                                                                                                                        | <b>detail extensive none</b>  |
| <b>Type</b>                              | Type of interface. <b>Software-Pseudo</b> indicates a standard software interface with no associated hardware device.                                                                                                                                | All levels                    |
| <b>Link-level type</b>                   | Encapsulation being used on the physical interface.                                                                                                                                                                                                  | All levels                    |
| <b>MTU</b>                               | MTU size on the physical interface.                                                                                                                                                                                                                  | All levels                    |
| <b>Clocking</b>                          | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                               | <b>brief detail extensive</b> |
| <b>Speed</b>                             | Speed at which the interface is running.                                                                                                                                                                                                             | <b>brief detail extensive</b> |
| <b>Device flags</b>                      | Information about the physical device. Possible values are described in the “Device Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                           | All levels                    |
| <b>Interface flags</b>                   | Information about the interface. Possible values are described in the “Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                              | All levels                    |
| <b>Link type</b>                         | Encapsulation being used on the physical interface.                                                                                                                                                                                                  | <b>detail extensive</b>       |
| <b>Link flags</b>                        | Information about the link. Possible values are described in the “Link Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                        | <b>detail extensive</b>       |
| <b>Physical info</b>                     | Information about the physical interface.                                                                                                                                                                                                            | <b>detail extensive</b>       |
| <b>Hold-times</b>                        | Current interface hold-time up and hold-time down. Value is in milliseconds.                                                                                                                                                                         | <b>detail extensive</b>       |
| <b>Current address, Hardware address</b> | Configured MAC address and hardware MAC address.                                                                                                                                                                                                     | <b>detail extensive</b>       |
| <b>Alternate link address</b>            | Backup address of the link.                                                                                                                                                                                                                          | <b>detail extensive</b>       |
| <b>Last flapped</b>                      | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> . | <b>detail extensive none</b>  |
| <b>Statistics last cleared</b>           | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                    | <b>detail extensive</b>       |

Table 54: Discard show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Input errors</b>       | <p>Input errors on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>                                                                                                                       | <b>detail extensive</b> |
| <b>Output errors</b>      | <p>(Extensive only) Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>detail extensive</b> |
| <b>Logical Interface</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |
| <b>Logical interface</b>  | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels              |
| <b>Index</b>              | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>SNMP ifIndex</b>       | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |

Table 54: Discard show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                       | Level of Output              |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Flags</b>         | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | All levels                   |
| <b>Encapsulation</b> | Encapsulation on the logical interface.                                                                                                                                                 | All levels                   |
| <b>Protocol</b>      | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , or <b>mpls</b> .                                                                               | All levels                   |
| <b>MTU</b>           | MTU size on the logical interface.                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Generation</b>    | Unique number for use by Juniper Networks technical support only.                                                                                                                       | <b>detail extensive</b>      |
| <b>Route Table</b>   | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                      | <b>detail extensive</b>      |

## Sample Output

### show interfaces dsc

```

user@host> show interfaces dsc
Physical interface: dsc, Enabled, Physical link is Up
 Interface index: 5, SNMP ifIndex: 5
 Type: Software-Pseudo, MTU: Unlimited
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link flags : None
 Last flapped : Never
 Input packets : 0
 Output packets: 0

 Logical interface dsc.0 (Index 66) (SNMP ifIndex 235)
 Flags: Point-To-Point SNMP-Traps Encapsulation: Unspecified
 Protocol inet, MTU: Unlimited
 Flags: None

```

### show interfaces dsc brief

```

user@host> show interfaces dsc brief
Physical interface: dsc, Enabled, Physical link is Up
 Type: Software-Pseudo, Link-level type: Unspecified, MTU: Unlimited, Clocking:
 Unspecified, Speed: Unspecified
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps

 Logical interface dsc.0
 Flags: Point-To-Point SNMP-Traps Encapsulation: Unspecified
 inet

```

### show interfaces dsc detail

```

user@host> show interfaces dsc detail
Physical interface: dsc, Enabled, Physical link is Up
 Interface index: 5, SNMP ifIndex: 5, Generation: 9
 Type: Software-Pseudo, Link-level type: Unspecified, MTU: Unlimited, Clocking:

```



```

Unspecified, Speed: Unspecified
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link type : Unspecified
Link flags : None
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: Unspecified, Hardware address: Unspecified
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

Logical interface dsc.0 (Index 66) (SNMP ifIndex 235) (Generation 6)
 Flags: Point-To-Point SNMP-Traps Encapsulation: Unspecified
 Protocol inet, MTU: Unlimited, Generation: 14, Route table: 0
 Flags: None

```

#### show interfaces dsc extensive

```

user@host> show interfaces dsc extensive
Physical interface: dsc, Enabled, Physical link is Up
 Interface index: 5, SNMP ifIndex: 5, Generation: 9
 Type: Software-Pseudo, Link-level type: Unspecified, MTU: Unlimited, Clocking:
Unspecified, Speed: Unspecified
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link type : Unspecified
Link flags : None
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: Unspecified, Hardware address: Unspecified
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
 Resource errors: 0
Logical interface dsc.0 (Index 66) (SNMP ifIndex 235) (Generation 6)
 Flags: Point-To-Point SNMP-Traps Encapsulation: Unspecified
 Protocol inet, MTU: Unlimited, Generation: 14, Route table: 0

```

## show interfaces (Fast Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show interfaces <i>interface-type</i><br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Display status information about the specified Fast Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><i>interface-type</i>—On M Series and T Series routers, the interface type is <i>fe-fpc/pic/port</i>.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show interfaces (Fast Ethernet) on page 1134</a><br><a href="#">show interfaces brief (Fast Ethernet) on page 1134</a><br><a href="#">show interfaces detail (Fast Ethernet) on page 1134</a><br><a href="#">show interfaces extensive (Fast Ethernet) on page 1135</a>                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | Table 55 on page 1120 lists the output fields for the <b>show interfaces</b> (Fast Ethernet) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 55: show interfaces Fast Ethernet Output Fields

| Field Name                | Field Description                                                                                                                                           | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                             |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                             | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface index</b>    | Index number of the physical interface, which reflects its initialization sequence.                                                                         | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                           | <b>detail extensive</b>      |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name       | Field Description                                                                                                                                                                                                                                   | Level of Output  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Link-level type  | Encapsulation being used on the physical interface.                                                                                                                                                                                                 | All levels       |
| MTU              | Maximum transmission unit size on the physical interface.                                                                                                                                                                                           | All levels       |
| Link-mode        | Type of link connection configured for the physical interface: <b>Full-duplex</b> or <b>Half-duplex</b>                                                                                                                                             | <b>extensive</b> |
| Speed            | Speed at which the interface is running.                                                                                                                                                                                                            | All levels       |
| Loopback         | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                                                                                                      | All levels       |
| Source filtering | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                        | All levels       |
| LAN-PHY mode     | 10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.                                                       | All levels       |
| WAN-PHY mode     | 10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.                           | All levels       |
| Unidirectional   | Unidirectional link mode status for 10-Gigabit Ethernet interface: <b>Enabled</b> or <b>Disabled</b> for parent interface; <b>Rx-only</b> or <b>Tx-only</b> for child interfaces.                                                                   | All levels       |
| Flow control     | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                            | All levels       |
| Auto-negotiation | (Gigabit Ethernet interfaces) Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                           | All levels       |
| Remote-fault     | (Gigabit Ethernet interfaces) Remote fault status: <ul style="list-style-type: none"> <li>• <b>Online</b>—Autonegotiation is manually configured as online.</li> <li>• <b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul> | All levels       |
| Device flags     | Information about the physical device. Possible values are described in the "Device Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                           | All levels       |
| Interface flags  | Information about the interface. Possible values are described in the "Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                              | All levels       |
| Link flags       | Information about the link. Possible values are described in the "Links Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                       | All levels       |
| Wavelength       | (10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).                                                                                                              | All levels       |
| Frequency        | (10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).                                                                                                                    | All levels       |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output       |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| CoS queues              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | detail extensive none |
| Schedulers              | (GigabitEthernet intelligent queuing 2 (IQ2) interfaces only) Number of CoS schedulers configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | extensive             |
| Hold-times              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive      |
| Current address         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive none |
| Hardware address        | Hardware MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive none |
| Last flapped            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | detail extensive none |
| Input Rate              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | None specified        |
| Output Rate             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | None specified        |
| Statistics last cleared | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | detail extensive      |
| Traffic statistics      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p>Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes.</p> <p>For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see Table 31 under the <a href="#">show interfaces (10-Gigabit Ethernet)</a> command.</p> | detail extensive      |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output  |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Input errors</b> | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored by configuring the <b>ignore-l3-incompletes</b> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b>           | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues</b>           | <p>Total number of egress queues supported on the specified interface.</p> <p><b>NOTE:</b> In DPCs that are not of the enhanced type, such as DPC 40x 1GE R, DPCE 20x 1GE + 2x 10GE R, or DPCE 40x 1GE R, you might notice a discrepancy in the output of the <b>show interfaces</b> command because incoming packets might be counted in the Egress queues section of the output. This problem occurs on non-enhanced DPCs because the egress queue statistics are polled from IMQ (Inbound Message Queuing) block of the I-chip. The IMQ block does not differentiate between ingress and egress WAN traffic; as a result, the combined statistics are displayed in the egress queue counters on the Routing Engine. In a simple VPLS scenario, if there is no MAC entry in DMAC table (by sending unidirectional traffic), traffic is flooded and the input traffic is accounted in IMQ. For bidirectional traffic (MAC entry in DMAC table), if the outgoing interface is on the same I-chip then both ingress and egress statistics are counted in a combined way. If the outgoing interface is on a different I-chip or FPC, then only egress statistics are accounted in IMQ. This behavior is expected with non-enhanced DPCs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Queue counters (Egress)</b> | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Ingress queues</b>                   | Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>             |
| <b>Queue counters (Ingress)</b>         | CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces. <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>             |
| <b>Active alarms and Active defects</b> | Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the routing device configuration, an alarm can ring the red or yellow alarm bell on the routing device, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b> . <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul> | <b>detail extensive none</b> |
| <b>OTN FEC statistics</b>               | The forward error correction (FEC) counters provide the following statistics: <ul style="list-style-type: none"> <li>• <b>Corrected Errors</b>—The count of corrected errors in the last second.</li> <li>• <b>Corrected Error Ratio</b>—The corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits.</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |                              |
| <b>PCS statistics</b>                   | (10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device. <ul style="list-style-type: none"> <li>• <b>Bit errors</b>—The number of seconds during which at least one bit error rate (BER) occurred while the PCS receiver is operating in normal mode.</li> <li>• <b>Errored blocks</b>—The number of seconds when at least one errored block occurred while the PCS receiver is operating in normal mode.</li> </ul>                                                                                                                                                                                                           | <b>detail extensive</b>      |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| MAC statistics                 | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> <li>• <b>Total octets and total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see Table 31 under the <a href="#">show interfaces (10-Gigabit Ethernet)</a> command.</li> <li>• <b>Unicast packets, Broadcast packets, and Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of frames that exceed 1518 octets.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul> | extensive       |
| OTN Received Overhead Bytes    | APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | extensive       |
| OTN Transmitted Overhead Bytes | APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | extensive       |



Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Filter statistics</b> | <p><b>Receive</b> and <b>Transmit</b> statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> <li>• <b>Input packet count</b>—Number of packets received from the MAC hardware that the filter processed.</li> <li>• <b>Input packet rejects</b>—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address.</li> <li>• <b>Input DA rejects</b>—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the routing device from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local routing device (which the routing device is rejecting).</li> <li>• <b>Input SA rejects</b>—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect.</li> <li>• <b>Output packet count</b>—Number of packets that the filter has given to the MAC hardware.</li> <li>• <b>Output packet pad count</b>—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured.</li> <li>• <b>Output packet error count</b>—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment.</li> <li>• <b>CAM destination filters, CAM source filters</b>—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0.</li> </ul> | <b>extensive</b> |
| <b>PMA PHY</b>           | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PHY Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS section</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>WIS line</b>    | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS path</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information                 | <p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner:</b> <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is <b>None</b>. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> </ul> </li> <li>• <b>Local resolution</b>—Information from the link partner: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |
| Received path trace, Transmitted path trace | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other routing device manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the routing device at the other end of the fiber. The transmitted path trace value is the message that this routing device transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | extensive       |
| Packet Forwarding Engine configuration      | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>   | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>             | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>      | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> none |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>VLAN-Tag</b>                | <p>Rewrite profile applied to incoming or outgoing frames on the outer (<b>Out</b>) VLAN tag or for both the outer and inner (<b>In</b>) VLAN tags.</p> <ul style="list-style-type: none"> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>pop</b>—The outer VLAN tag of the incoming frame is removed.</li> <li>• <b>swap</b>—The outer VLAN tag of the incoming frame is overwritten with the user specified VLAN tag information.</li> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>push-push</b>—Two VLAN tags are pushed in from the incoming frame.</li> <li>• <b>swap-push</b>—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame.</li> <li>• <b>swap-swap</b>—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user specified VLAN tag value.</li> <li>• <b>pop-swap</b>—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.</li> <li>• <b>pop-pop</b>—Both the outer and inner VLAN tags of the incoming frame are removed.</li> </ul> | <b>brief detail extensive none</b> |
| <b>Demux:</b>                  | <p>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</p> <ul style="list-style-type: none"> <li>• Source Family Inet</li> <li>• Destination Family Inet</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b>       |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                         |
| <b>Protocol</b>                | Protocol family. Possible values are described in the “Protocol Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b>       |
| <b>MTU</b>                     | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b>       |
| <b>Maximum labels</b>          | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b>       |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface set</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface set.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>            |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>                   |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to the routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>                   |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b>       | Number and rate of bytes and packets transiting the switch.<br><br><b>NOTE:</b> For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the <b>Output bytes</b> and <b>Output packets</b> interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler. | <b>extensive</b>             |
| <b>Generation</b>               | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Route Table</b>              | Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Flags</b>                    | Information about protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Donor interface</b>          | (Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Preferred source address</b> | (Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Input Filters</b>            | Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Output Filters</b>           | Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Mac-Validate Failures</b>    | Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>         | Information about the address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b>   | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>brief</b>                 |
| <b>Flags</b>                    | Information about address flag (possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Destination</b>              | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Local</b>                    | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Broadcast</b>                | Broadcast address of the logical interlace.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |

Table 55: show interfaces Fast Ethernet Output Fields (*continued*)

| Field Name | Field Description                                                 | Level of Output  |
|------------|-------------------------------------------------------------------|------------------|
| Generation | Unique number for use by Juniper Networks technical support only. | detail extensive |

## Sample Output

### show interfaces (Fast Ethernet)

```

user@host> show interfaces fe-0/0/0
Physical interface: fe-0/0/0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 22
 Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 CoS queues : 4 supported, 4 maximum usable queues
 Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
 Last flapped : 2006-01-20 14:50:58 PST (2w4d 00:44 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Active alarms : None
 Active defects : None
 Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255

```

### show interfaces brief (Fast Ethernet)

```

user@host> show interfaces fe-0/0/0 brief
Physical interface: fe-0/0/0, Enabled, Physical link is Up
 Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Logical interface fe-0/0/0.0
 Flags: SNMP-Traps Encapsulation: ENET2
 inet 10.10.10.1/24

```

### show interfaces detail (Fast Ethernet)

```

user@host> show interfaces fe-0/0/0 detail
Physical interface: fe-0/0/0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 22, Generation: 5391
 Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
 Last flapped : 2006-01-20 14:50:58 PST (2w4d 00:45 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes: 42 0 bps

```



```

Input packets: 0 0 pps
Output packets: 1 0 pps
Active alarms : None
Active defects : None
Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500, Generation: 105, Route table: 0
 Flags: Is-Primary, Mac-Validate-Strict
 Mac-Validate Failures: Packets: 0, Bytes: 0
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255,
 Generation: 136

```

### show interfaces extensive (Fast Ethernet)

```

user@host> show interfaces fe-0/0/0 extensive
Physical interface: fe-0/0/0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 22, Generation: 5391
Link-level type: Ethernet, MTU: 1514, Link-mode: Full-duplex, Speed:
100mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
CoS queues : 4 supported, 4 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
Last flapped : 2006-01-20 14:50:58 PST (2w4d 00:46 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 42 0 bps
Input packets: 0 0 pps
Output packets: 1 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Active alarms : None
Active defects : None
MAC statistics:

```

|                    | Receive | Transmit |
|--------------------|---------|----------|
| Total octets       | 0       | 64       |
| Total packets      | 0       | 1        |
| Unicast packets    | 0       | 0        |
| Broadcast packets  | 0       | 1        |
| Multicast packets  | 0       | 0        |
| CRC/Align errors   | 0       | 0        |
| FIFO errors        | 0       | 0        |
| MAC control frames | 0       | 0        |
| MAC pause frames   | 0       | 0        |
| Oversized frames   | 0       |          |
| Jabber frames      | 0       |          |
| Fragment frames    | 0       |          |
| VLAN tagged frames | 0       |          |
| Code violations    | 0       |          |

```

Filter statistics:
Input packet count 0
Input packet rejects 0

```

```
Input DA rejects 0
Input SA rejects 0
Output packet count 1
Output packet pad count 0
Output packet error count 0
CAM destination filters: 1, CAM source filters: 0
Autonegotiation information:
Negotiation status: Complete
Link partner:
 Link partner: Full-duplex, Flow control: None, Remote fault: Ok
Local resolution:
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 950000000 95 0 low none
3 network-control 5 50000000 5 0 low none
Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 105, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255,
 Generation: 136
```

## show interfaces (Gigabit Ethernet)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>ge-fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Display status information about the specified Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><b><i>ge-fpc/pic/port</i></b>—Display standard information about the specified Gigabit Ethernet interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p>                                                                                                                                                             |
| <b>Additional Information</b>   | In a logical system, this command displays information only about the logical interfaces and not about the physical interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (Gigabit Ethernet) on page 1153</a></p> <p><a href="#">show interfaces (Gigabit Ethernet on MX Series Routers) on page 1154</a></p> <p><a href="#">show interfaces extensive (Gigabit Ethernet on MX Series Routers showing interface transmit statistics configuration) on page 1154</a></p> <p><a href="#">show interfaces brief (Gigabit Ethernet) on page 1154</a></p> <p><a href="#">show interfaces detail (Gigabit Ethernet) on page 1155</a></p> <p><a href="#">show interfaces extensive (Gigabit Ethernet IQ2) on page 1156</a></p> <p><a href="#">show interfaces (Gigabit Ethernet Unnumbered Interface) on page 1159</a></p> <p><a href="#">show interfaces (ACI Interface Set Configured) on page 1160</a></p> |
| <b>Output Fields</b>            | <p><a href="#">Table 56 on page 1138</a> describes the output fields for the <b>show interfaces</b> (Gigabit Ethernet) command. Output fields are listed in the approximate order in which they appear. For Gigabit Ethernet IQ and IQE PICs, the traffic and MAC statistics vary by interface type. For more information, see <a href="#">Table 57 on page 1152</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                   |

Table 56: show interfaces (Gigabit Ethernet) Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                                   | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                                                                                                     |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                     | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                         | All levels                   |
| <b>Interface index</b>    | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                   | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                 | All levels                   |
| <b>MTU</b>                | Maximum transmission unit size on the physical interface.                                                                                                                                                                                           | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                            | All levels                   |
| <b>Loopback</b>           | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                                                                                                      | All levels                   |
| <b>Source filtering</b>   | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                        | All levels                   |
| <b>LAN-PHY mode</b>       | 10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.                                                       | All levels                   |
| <b>WAN-PHY mode</b>       | 10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.                           | All levels                   |
| <b>Unidirectional</b>     | Unidirectional link mode status for 10-Gigabit Ethernet interface: <b>Enabled</b> or <b>Disabled</b> for parent interface; <b>Rx-only</b> or <b>Tx-only</b> for child interfaces.                                                                   | All levels                   |
| <b>Flow control</b>       | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                            | All levels                   |
| <b>Auto-negotiation</b>   | (Gigabit Ethernet interfaces) Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                           | All levels                   |
| <b>Remote-fault</b>       | (Gigabit Ethernet interfaces) Remote fault status: <ul style="list-style-type: none"> <li>• <b>Online</b>—Autonegotiation is manually configured as online.</li> <li>• <b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul> | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                           | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                              | All levels                   |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                           | Level of Output              |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link flags</b>               | Information about the link. Possible values are described in the “Links Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                              | All levels                   |
| <b>Wavelength</b>               | (10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).                                                                                                                                      | All levels                   |
| <b>Frequency</b>                | (10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).                                                                                                                                            | All levels                   |
| <b>CoS queues</b>               | Number of CoS queues configured.                                                                                                                                                                                                                                            | <b>detail extensive</b> none |
| <b>Schedulers</b>               | (Gigabit Ethernet intelligent queuing 2 [IQ2] interfaces only) Number of CoS schedulers configured.                                                                                                                                                                         | <b>extensive</b>             |
| <b>Hold-times</b>               | Current interface hold-time up and hold-time down, in milliseconds (ms).                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Current address</b>          | Configured MAC address.                                                                                                                                                                                                                                                     | <b>detail extensive</b> none |
| <b>Hardware address</b>         | Hardware MAC address.                                                                                                                                                                                                                                                       | <b>detail extensive</b> none |
| <b>Last flapped</b>             | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                        | <b>detail extensive</b> none |
| <b>Input Rate</b>               | Input rate in bits per second (bps) and packets per second (pps). The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level. | None                         |
| <b>Output Rate</b>              | Output rate in bps and pps. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.                                        | None                         |
| <b>Statistics last cleared</b>  | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Egress account overhead</b>  | Layer 2 overhead in bytes that is accounted in the interface statistics for egress traffic.                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Ingress account overhead</b> | Layer 2 overhead in bytes that is accounted in the interface statistics for ingress traffic.                                                                                                                                                                                | <b>detail extensive</b>      |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface. The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p>Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes.</p> <p>For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see Table 31 under the <a href="#">show interfaces (10-Gigabit Ethernet)</a> command.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |
| <b>Input errors</b>       | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored by configuring the <b>ignore-l3-incompletes</b> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output         |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b> | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), the <b>Drops</b> field does not always use the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p> <ul style="list-style-type: none"> <li>• <b>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues</b> | <p>Total number of egress queues supported on the specified interface.</p> <p><b>NOTE:</b> In DPCs that are not of the enhanced type, such as DPC 40x 1GER, DPCE 20x 1GE + 2x 10GE R, or DPCE 40x 1GE R, you might notice a discrepancy in the output of the <b>show interfaces</b> command because incoming packets might be counted in the Egress queues section of the output. This problem occurs on non-enhanced DPCs because the egress queue statistics are polled from IMQ (Inbound Message Queuing) block of the I-chip. The IMQ block does not differentiate between ingress and egress WAN traffic; as a result, the combined statistics are displayed in the egress queue counters on the Routing Engine. In a simple VPLS scenario, if there is no MAC entry in DMAC table (by sending unidirectional traffic), traffic is flooded and the input traffic is accounted in IMQ. For bidirectional traffic (MAC entry in DMAC table), if the outgoing interface is on the same I-chip then both ingress and egress statistics are counted in a combined way. If the outgoing interface is on a different I-chip or FPC, then only egress statistics are accounted in IMQ. This behavior is expected with non-enhanced DPCs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Queue counters (Egress)          | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), the <b>Dropped packets</b> field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p>                                                       | detail extensive      |
| Ingress queues                   | Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive             |
| Queue counters (Ingress)         | <p>CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                              | extensive             |
| Active alarms and Active defects | <p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul> | detail extensive none |
| Interface transmit statistics    | <p>(On MX Series devices) Status of the <b>interface-transmit-statistics</b> configuration: Enabled or Disabled.</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—When the <b>interface-transmit-statistics</b> statement is included in the configuration. If this is configured, the interface statistics show the actual transmitted load on the interface.</li> <li>• <b>Disabled</b>—When the <b>interface-transmit-statistics</b> statement is not included in the configuration. If this is not configured, the interface statistics show the offered load on the interface.</li> </ul>                                                                                     | detail extensive      |
| OTN FEC statistics               | <p>The forward error correction (FEC) counters provide the following statistics:</p> <ul style="list-style-type: none"> <li>• <b>Corrected Errors</b>—Count of corrected errors in the last second.</li> <li>• <b>Corrected Error Ratio</b>—Corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits.</li> </ul>                                                                                                                                                                                                                                                                                                                                        | detail extensive      |



Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>PCS statistics</b> | <p>(10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device.</p> <ul style="list-style-type: none"><li>• <b>Bit errors</b>—Number of seconds during which at least one bit error rate (BER) occurred while the PCS receiver is operating in normal mode.</li><li>• <b>Errored blocks</b>—Number of seconds when at least one errored block occurred while the PCS receiver is operating in normal mode.</li></ul> | <b>detail extensive</b> |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| MAC statistics                 | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see Table 31 under the <a href="#">show interfaces (10-Gigabit Ethernet)</a> command.</li> <li>• <b>Unicast packets</b>, <b>Broadcast packets</b>, and <b>Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—There are two possible conditions regarding the number of oversized frames: <ul style="list-style-type: none"> <li>• Packet length exceeds 1518 octets, or</li> <li>• Packet length exceeds MRU</li> </ul> </li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets) and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. <p><b>NOTE:</b> The 20-port Gigabit Ethernet MIC (MIC-3D-20GE-SFP) does not have hardware counters for VLAN frames. Therefore, the <b>VLAN tagged frames</b> field displays 0 when the <b>show interfaces</b> command is executed on a 20-port Gigabit Ethernet MIC. In other words, the number of VLAN tagged frames cannot be determined for the 20-port Gigabit Ethernet MIC.</p> </li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul> | extensive       |
| OTN Received Overhead Bytes    | APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | extensive       |
| OTN Transmitted Overhead Bytes | APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | extensive       |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Filter statistics</b> | <p><b>Receive</b> and <b>Transmit</b> statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> <li>• <b>Input packet count</b>—Number of packets received from the MAC hardware that the filter processed.</li> <li>• <b>Input packet rejects</b>—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address.</li> <li>• <b>Input DA rejects</b>—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the router from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local router (which the router is rejecting).</li> <li>• <b>Input SA rejects</b>—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect.</li> <li>• <b>Output packet count</b>—Number of packets that the filter has given to the MAC hardware.</li> <li>• <b>Output packet pad count</b>—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured.</li> <li>• <b>Output packet error count</b>—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment.</li> <li>• <b>CAM destination filters, CAM source filters</b>—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0.</li> </ul> | <b>extensive</b> |
| <b>PMA PHY</b>           | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PHY Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>extensive</b> |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS section</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b> |
| <b>WIS line</b>    | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>WIS path</b> | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information:</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. Any state other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information                 | <p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner</b>—Information from the remote Ethernet device: <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the link partner, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the link partner. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), <b>Symmetric/Asymmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> on transmit), and <b>None</b> (link partner does not support flow control).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> </ul> </li> <li>• <b>Local resolution</b>—Information from the local Ethernet device: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the local device. For Gigabit Ethernet interfaces, advertised capabilities are <b>Symmetric/Asymmetric</b> (local device supports <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> on receive) and <b>None</b> (local device does not support flow control). Depending on the result of the negotiation with the link partner, local resolution flow control type will display <b>Symmetric</b> (local device supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (local device supports <b>PAUSE</b> on receive), and <b>None</b> (local device does not support flow control).</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |
| Received path trace, Transmitted path trace | <p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | extensive       |
| Packet Forwarding Engine configuration      | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | extensive       |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>   | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>             | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>      | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                                                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output                    |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>VLAN-Tag</b>                                           | <p>Rewrite profile applied to incoming or outgoing frames on the outer (<b>Out</b>) VLAN tag or for both the outer and inner (<b>In</b>) VLAN tags.</p> <ul style="list-style-type: none"> <li><b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li><b>pop</b>—The outer VLAN tag of the incoming frame is removed.</li> <li><b>swap</b>—The outer VLAN tag of the incoming frame is overwritten with the user-specified VLAN tag information.</li> <li><b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li><b>push-push</b>—Two VLAN tags are pushed in from the incoming frame.</li> <li><b>swap-push</b>—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame.</li> <li><b>swap-swap</b>—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user-specified VLAN tag value.</li> <li><b>pop-swap</b>—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.</li> <li><b>pop-pop</b>—Both the outer and inner VLAN tags of the incoming frame are removed.</li> </ul> | <b>brief detail extensive none</b> |
| <b>Demux</b>                                              | <p>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</p> <ul style="list-style-type: none"> <li>Source Family Inet</li> <li>Destination Family Inet</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b>       |
| <b>Encapsulation</b>                                      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels                         |
| <b>ACI VLAN: Dynamic Profile</b>                          | Name of the dynamic profile that defines the agent circuit identifier (ACI) interface set. If configured, the ACI interface set enables the underlying Ethernet interface to create dynamic VLAN subscriber interfaces based on ACI information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief detail extensive none</b> |
| <b>Protocol</b>                                           | Protocol family. Possible values are described in the "Protocol Field" section under " <a href="#">Common Output Fields Description</a> " on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b>       |
| <b>MTU</b>                                                | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b>       |
| <b>Neighbor Discovery Protocol (NDP) Queue Statistics</b> | <p>NDP statistics for protocol <b>inet6</b> under logical interface statistics.</p> <ul style="list-style-type: none"> <li><b>Max nh cache</b>—Maximum interface neighbor discovery nexthop cache size.</li> <li><b>New hold nh limit</b>—Maximum number of new unresolved nexthops.</li> <li><b>Curr nh cnt</b>—Current number of resolved nexthops in the NDP queue.</li> <li><b>Curr new hold cnt</b>—Current number of unresolved nexthops in the NDP queue.</li> <li><b>NH drop cnt</b>—Number of NDP requests not serviced.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                         |
| <b>Dynamic Profile</b>                                    | Name of the dynamic profile that was used to create this interface configured with a Point-to-Point Protocol over Ethernet (PPPoE) family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b>       |
| <b>Service Name Table</b>                                 | Name of the service name table for the interface configured with a PPPoE family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b>       |



Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Max Sessions</b>            | Maximum number of PPPoE logical interfaces that can be activated on the underlying interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Duplicate Protection</b>    | State of PPPoE duplicate protection: <b>On</b> or <b>Off</b> . When duplicate protection is configured for the underlying interface, a dynamic PPPoE logical interface cannot be activated when an existing active logical interface is present for the same PPPoE client.                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Direct Connect</b>          | State of the configuration to ignore DSL Forum VSAs: <b>On</b> or <b>Off</b> . When configured, the router ignores any of these VSAs received from a directly connected CPE device on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>AC Name</b>                 | Name of the access concentrator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Maximum labels</b>          | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface set. The value in this field also includes the Layer 2 overhead bytes for ingress or egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface set.</li> </ul>                                                                           | <b>detail extensive</b>      |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b>             |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>extensive</b>             |
| <b>Transit statistics</b>      | <p>Number and rate of bytes and packets transiting the switch.</p> <p><b>NOTE:</b> For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the <b>Output bytes</b> and <b>Output packets</b> interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler.</p> | <b>extensive</b>             |
| <b>Generation</b>              | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Route Table</b>             | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Flags</b>                   | Information about protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |

Table 56: show interfaces (Gigabit Ethernet) Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                    | Level of Output              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Donor interface</b>          | (Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.                                                                                                 | <b>detail extensive none</b> |
| <b>Preferred source address</b> | (Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.                                        | <b>detail extensive none</b> |
| <b>Input Filters</b>            | Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parentheses next to all interfaces.  | <b>detail extensive</b>      |
| <b>Output Filters</b>           | Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parentheses next to all interfaces. | <b>detail extensive</b>      |
| <b>Mac-Validate Failures</b>    | Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.                                           | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>         | Information about the address flags. Possible values are described in the "Addresses Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                           | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b>   | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                             | <b>brief</b>                 |
| <b>Flags</b>                    | Information about the address flag. Possible values are described in the "Addresses Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                            | <b>detail extensive none</b> |
| <b>Destination</b>              | IP address of the remote side of the connection.                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Local</b>                    | IP address of the logical interface.                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Broadcast</b>                | Broadcast address of the logical interface.                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>               | Unique number for use by Juniper Networks technical support only.                                                                                                                                    | <b>detail extensive</b>      |

Table 57: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type

| Interface Type             | Sample Command                                | Byte and Octet Counts Include                                                                                                                                                                                       | Comments                                |
|----------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Inbound physical interface | <b>show interfaces<br/>ge-0/3/0 extensive</b> | <p>Traffic statistics:</p> <p>Input bytes: 496 bytes per packet, representing the Layer 2 packet</p> <p>MAC statistics:</p> <p>Received octets: 500 bytes per packet, representing the Layer 2 packet + 4 bytes</p> | The additional 4 bytes are for the CRC. |

Table 57: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type (*continued*)

| Interface Type              | Sample Command                               | Byte and Octet Counts Include                                                                                                                                                                                 | Comments                                                                                                                                           |
|-----------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Inbound logical interface   | <b>show interfaces ge-0/3/0.50 extensive</b> | Traffic statistics:<br><br>Input bytes: 478 bytes per packet, representing the Layer 3 packet                                                                                                                 |                                                                                                                                                    |
| Outbound physical interface | <b>show interfaces ge-0/0/0 extensive</b>    | Traffic statistics:<br><br>Input bytes: 490 bytes per packet, representing the Layer 3 packet + 12 bytes<br><br>MAC statistics:<br><br>Received octets: 478 bytes per packet, representing the Layer 3 packet | For input bytes, the additional 12 bytes include 6 bytes for the destination MAC address plus 4 bytes for VLAN plus 2 bytes for the Ethernet type. |
| Outbound logical interface  | <b>show interfaces ge-0/0/0.50 extensive</b> | Traffic statistics:<br><br>Input bytes: 478 bytes per packet, representing the Layer 3 packet                                                                                                                 |                                                                                                                                                    |

## Sample Output

### show interfaces (Gigabit Ethernet)

```

user@host> show interfaces ge-3/0/2
Physical interface: ge-3/0/2, Enabled, Physical link is Up
 Interface index: 167, SNMP ifIndex: 35
 Link-level type: 52, MTU: 1522, Speed: 1000mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled
 Remote fault: Online
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 CoS queues : 4 supported, 4 maximum usable queues
 Current address: 00:05:85:4a:e9:7c, Hardware address: 00:05:85:4a:e9:7c
 Last flapped : 2006-08-10 17:25:10 PDT (00:01:08 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Ingress rate at Packet Forwarding Engine : 0 bps (0 pps)
 Ingress drop rate at Packet Forwarding Engine : 0 bps (0 pps)
 Active alarms : None
 Active defects : None

Logical interface ge-3/0/2.0 (Index 72) (SNMP ifIndex 69)
 Flags: SNMP-Traps 0x4000
 VLAN-Tag [0x8100.512 0x8100.513] In(pop-swap 0x8100.530) Out(swap-push
0x8100.512 0x8100.513)
 Encapsulation: VLAN-CCC
 Egress account overhead: 100
 Ingress account overhead: 90
 Input packets : 0
 Output packets: 0
 Protocol ccc, MTU: 1522
 Flags: Is-Primary

```

### show interfaces (Gigabit Ethernet on MX Series Routers)

```
user@host> show interfaces ge-2/2/2
Physical interface: ge-2/2/2, Enabled, Physical link is Up
 Interface index: 156, SNMP ifIndex: 188
 Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, MAC-REWRITE Error: None,
 Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
 Remote fault: Online
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 4 maximum usable queues
 Schedulers : 0
 Current address: 00:1f:12:b7:d7:c0, Hardware address: 00:1f:12:b7:d6:76
 Last flapped : 2008-09-05 16:44:30 PDT (3d 01:04 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Active alarms : None
 Active defects : None
 Logical interface ge-2/2/2.0 (Index 82) (SNMP ifIndex 219)
 Flags: Up SNMP-Traps 0x4004000 Encapsulation: ENET2
 Input packets : 10232
 Output packets: 10294
 Protocol inet, MTU: 1500
 Flags: Sendbroadcast-pkt-to-re
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255
 Protocol inet6, MTU: 1500
 Max nh cache: 4, New hold nh limit: 100000, Curr nh cnt: 4, Curr new hold
 cnt: 4, NH drop cnt: 0
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 2011::/64, Local: 2011::5
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::223:9cff:fe9f:3e78
 Protocol multiservice, MTU: Unlimited
 Flags: Is-Primary
```

### show interfaces extensive (Gigabit Ethernet on MX Series Routers showing interface transmit statistics configuration)

```
user@host> show interfaces ge-2/1/2 extensive | match "output|interface"
Physical interface: ge-2/1/2, Enabled, Physical link is Up
 Interface index: 151, SNMP ifIndex: 530, Generation: 154
 Interface flags: SNMP-Traps Internal: 0x4000
 Output bytes : 240614363944 772721536 bps
 Output packets : 3538446506 1420444 pps
 Direction : Output
 Interface transmit statistics: Enabled

 Logical interface ge-2/1/2.0 (Index 331) (SNMP ifIndex 955) (Generation 146)
 Output bytes : 195560312716 522726272 bps
 Output packets : 4251311146 1420451 pps
```

### show interfaces brief (Gigabit Ethernet)

```
user@host> show interfaces ge-3/0/2 brief
Physical interface: ge-3/0/2, Enabled, Physical link is Up
 Link-level type: 52, MTU: 1522, Speed: 1000mbps, Loopback: Disabled,
```

```

Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None

```

```

Logical interface ge-3/0/2.0
 Flags: SNMP-Traps 0x4000
 VLAN-Tag [0x8100.512 0x8100.513] In(pop-swap 0x8100.530) Out(swap-push
0x8100.512 0x8100.513)
 Encapsulation: VLAN-CCC
 ccc

```

```

Logical interface ge-3/0/2.32767
 Flags: SNMP-Traps 0x4000 VLAN-Tag [0x0000.0] Encapsulation: ENET2

```

### show interfaces detail (Gigabit Ethernet)

```

user@host> show interfaces ge-3/0/2 detail
Physical interface: ge-3/0/2, Enabled, Physical link is Up
 Interface index: 167, SNMP ifIndex: 35, Generation: 177
 Link-level type: 52, MTU: 1522, Speed: 1000mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
 Remote fault: Online
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:05:85:4a:e9:7c, Hardware address: 00:05:85:4a:e9:7c
 Last flapped : 2006-08-09 17:17:00 PDT (01:31:33 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 Ingress traffic statistics at Packet Forwarding Engine:
 Input bytes : 0 0 bps
 Input packets : 0 0 pps
 Drop bytes : 0 0 bps
 Drop packets : 0 0 pps
 Ingress queues: 4 supported, 4 in use
 Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 0              | 0                   | 0               |

```

 Egress queues: 4 supported, 4 in use
 Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |

```

3 network-cont 0 0 0

Active alarms : None
Active defects : None

Logical interface ge-3/0/2.0 (Index 72) (SNMP ifIndex 69) (Generation 140)
 Flags: SNMP-Traps 0x4000
 VLAN-Tag [0x8100.512 0x8100.513] In(pop-swap 0x8100.530)
 Out(swap-push 0x8100.512 0x8100.513)
 Encapsulation: VLAN-CCC
 Egress account overhead: 100
 Ingress account overhead: 90
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Protocol ccc, MTU: 1522, Generation: 149, Route table: 0
 Flags: Is-Primary

Logical interface ge-3/0/2.32767 (Index 71) (SNMP ifIndex 70)
(Generation 139)
 Flags: SNMP-Traps 0x4000 VLAN-Tag [0x0000.0] Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps

```

### show interfaces extensive (Gigabit Ethernet IQ2)

```

user@host> show interfaces ge-7/1/3 extensive
Physical interface: ge-7/1/3, Enabled, Physical link is Up
Interface index: 170, SNMP ifIndex: 70, Generation: 171
Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4004000
Link flags : None

```

```

CoS queues : 8 supported, 4 maximum usable queues
Schedulers : 256
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:14:f6:30:5e:74, Hardware address: 00:14:f6:30:5e:74
Last flapped : 2007-11-07 21:31:41 PST (02:03:33 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 38910844056 7952 bps
 Output bytes : 7174605 8464 bps
 Input packets: 418398473 11 pps
 Output packets: 78903 12 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Ingress traffic statistics at Packet Forwarding Engine:
 Input bytes : 38910799145 7952 bps
 Input packets: 418397956 11 pps
 Drop bytes : 0 0 bps
 Drop packets: 0 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 FIFO errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Ingress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 418390823 418390823 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 7133 7133 0

Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 1031 1031 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 77872 77872 0

Active alarms : None
Active defects : None
MAC statistics:
 Total octets 38910844056 7174605
 Total packets 418398473 78903
 Unicast packets 408021893366 1026
 Broadcast packets 10 12
 Multicast packets 418398217 77865
 CRC/Align errors 0 0
 FIFO errors 0 0

```

```

MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0 OTN Received Overhead Bytes:
APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58
Payload Type: 0x08
OTN Transmitted Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
Payload Type: 0x08
Filter statistics:
Input packet count 418398473
Input packet rejects 479
Input DA rejects 479
Input SA rejects 0
Output packet count 78903
Output packet pad count 0
Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
Negotiation status: Complete
Link partner:
Link mode: Full-duplex, Flow control: Symmetric/Asymmetric,
Remote fault: OK
Local resolution:
Flow control: Symmetric, Remote fault: Link OK
Packet Forwarding Engine configuration:
Destination slot: 7
CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 950000000 95 0
low none
3 network-control 5 50000000 5 0
low none
Direction : Input
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 950000000 95 0
low none
3 network-control 5 50000000 5 0
low none

Logical interface ge-7/1/3.0 (Index 70) (SNMP ifIndex 85) (Generation 150)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
Input bytes : 812400
Output bytes : 1349206
Input packets: 9429
Output packets: 9449
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Local statistics:
Input bytes : 812400
Output bytes : 1349206

```



```

Input packets: 9429
Output packets: 9449
Transit statistics:
Input bytes : 0 7440 bps
Output bytes : 0 7888 bps
Input packets: 0 10 pps
Output packets: 0 11 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Protocol inet, MTU: 1500, Generation: 169, Route table: 0
Flags: Is-Primary, Mac-Validate-Strict
Mac-Validate Failures: Packets: 0, Bytes: 0
Addresses, Flags: Is-Preferred Is-Primary
Input Filters: F1-ge-3/0/1.0-in, F3-ge-3/0/1.0-in
Output Filters: F2-ge-3/0/1.0-out (53)
Destination: 10.74.2/24, Local: 10.74.2.2, Broadcast: 10.74.2.255,
Generation: 196
Protocol multiservice, MTU: Unlimited, Generation: 170, Route table: 0
Flags: Is-Primary
Policer: Input: __default_arp_policer__

```

**NOTE:** For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics displayed in the **show interfaces** command output might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the interface counters. For detailed information, see the description of the logical interface **Transit statistics** fields in [Table 56 on page 1138](#).

### show interfaces (Gigabit Ethernet Unnumbered Interface)

```

user@host> show interfaces ge-3/2/0
Physical interface: ge-3/2/0, Enabled, Physical link is Up
Interface index: 148, SNMP ifIndex: 50
Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 4 maximum usable queues
Current address: 00:14:f6:11:26:f8, Hardware address: 00:14:f6:11:26:f8
Last flapped : 2006-10-27 04:42:23 PDT (08:01:52 ago)
Input rate : 0 bps (0 pps)
Output rate : 624 bps (1 pps)
Active alarms : None
Active defects : None

Logical interface ge-3/2/0.0 (Index 67) (SNMP ifIndex 85)
Flags: SNMP-Traps Encapsulation: ENET2
Input packets : 0
Output packets: 6
Protocol inet, MTU: 1500
Flags: Unnumbered
Donor interface: lo0.0 (Index 64)
Preferred source address: 22.22.22.22

```

### show interfaces (ACI Interface Set Configured)

```

user@host> show interfaces ge-1/0/0.4001
Logical interface ge-1/0/0.4001 (Index 340) (SNMP ifIndex 548)
 Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.4001] Encapsulation: PPP-over-
 Ethernet
 ACI VLAN:
 Dynamic Profile: aci-vlan-set-profile
 PPPoE:
 Dynamic Profile: aci-vlan-pppoe-profile,
 Service Name Table: None,
 Max Sessions: 32000, Max Sessions VSA Ignore: Off,
 Duplicate Protection: On, Short Cycle Protection: Off,
 Direct Connect: Off,
 AC Name: nbc
 Input packets : 9
 Output packets: 8
 Protocol multiservice, MTU: Unlimited

```

## show interfaces (M Series, MX Series, T Series Routers, and PTX Series Management and Internal Ethernet)

|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                                                                               | <a href="#">Syntax (M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface) on page 1161</a><br><a href="#">Syntax (M Series, MX Series, T Series, and PTX Series Routers Internal Ethernet Interface) on page 1161</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface)</b> | <pre>show interfaces em0   fxp0 &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (M Series, MX Series, T Series, and PTX Series Routers Internal Ethernet Interface)</b>   | <pre>show interfaces bcm0   em0   em1   fxp1   fxp2   ixgbe0   ixgbe1 &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                                                                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced on PTX Series Packet Transport Routers for Junos OS Release 12.1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                                                                                  | (M Series, T Series, TX Matrix Plus, and PTX Series devices only) Display status information about the management Ethernet and internal Ethernet interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                                                                                      | <p><b>em0   fxp0</b>—(M Series, MX Series, T Series, and PTX Series) Display standard information about the management Ethernet interface. For supported Ethernet interface by chassis and Routing Engine, see <a href="#">“Supported Routing Engines by Router” on page 14</a>.</p> <p><b>bcm0   em0   em1   fxp1   fxp2   ixgbe0   ixgbe1</b>—(M Series, MX Series, T Series, and PTX Series) Display standard information about the internal Ethernet interfaces. See <a href="#">“Supported Routing Engines by Router” on page 14</a> for the internal Ethernet interface names for each Routing Engine by hardware platform.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b>                                                                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

- List of Sample Output**
- [show interfaces brief \(Management Ethernet\) on page 1165](#)
  - [show interfaces \(Management Ethernet\) on page 1165](#)
  - [show interfaces \(Management Ethernet \[TX Matrix Plus Router\]\) on page 1166](#)
  - [show interfaces \(Management Ethernet \[PTX Series Packet Transport Routers\]\) on page 1166](#)
  - [show interfaces detail \(Management Ethernet\) on page 1166](#)
  - [show interfaces detail \(Management Ethernet \[TX Matrix Plus Router\]\) on page 1167](#)
  - [show interfaces detail \(Management Ethernet \[PTX Packet Transport Routers\]\) on page 1168](#)
  - [show interfaces extensive \(Management Ethernet\) on page 1168](#)
  - [show interfaces extensive \(Management Ethernet \[TX Matrix Plus Router\]\) on page 1169](#)
  - [show interfaces extensive \(Management Ethernet \[PTX Series Packet Transport Routers\]\) on page 1170](#)
  - [show interfaces brief \(Management Ethernet\) on page 1171](#)
  - [show interfaces brief \(Management Ethernet \[TX Matrix Plus Router\]\) on page 1171](#)
  - [show interfaces brief \(Management Ethernet \[PTX Series Packet Transport Routers\]\) on page 1171](#)
  - [show interfaces \(Internal Ethernet\) on page 1171](#)
  - [show interfaces \(Internal Ethernet \[TX Matrix Plus Router\]\) on page 1172](#)
  - [show interfaces detail \(Internal Ethernet\) on page 1172](#)
  - [show interfaces detail \(Internal Ethernet \[TX Matrix Plus Router\]\) on page 1173](#)
  - [show interfaces extensive \(internal Ethernet\) on page 1174](#)
  - [show interfaces extensive \(internal Ethernet \[TX Matrix Plus Router\]\) on page 1175](#)

**Output Fields** [Table 58 on page 1162](#) lists the output fields for the **show interfaces** (management) command on the M Series routers, T Series routers, TX Matrix Plus routers, and PTX Series. Output fields are listed in the approximate order in which they appear.

**Table 58: show interfaces Output Fields for M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface**

| Field Name                | Field Description                                                                                                                                            | Level of Output              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                              |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                              | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | All levels                   |
| <b>Interface index</b>    | Physical interface index number, which reflects its initialization sequence.                                                                                 | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                            | <b>detail extensive</b>      |
| <b>Type</b>               | Type of interface.                                                                                                                                           | All levels                   |
| <b>Link-level type</b>    | Encapsulation type used on the physical interface.                                                                                                           | All levels                   |
| <b>MTU</b>                | Maximum transmission unit (MTU)—Size of the largest packet to be transmitted.                                                                                | All levels                   |

**Table 58: show interfaces Output Fields for M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface (*continued*)**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                 | Level of Output              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Clocking</b>                | Reference clock source of the interface.                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Speed</b>                   | Network speed on the interface.                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| <b>Device flags</b>            | Information about the physical device. Possible values are described in the “Device Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                        | All levels                   |
| <b>Interface flags</b>         | Information about the interface. Possible values are described in the “Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                           | All levels                   |
| <b>Link type</b>               | Data transmission type.                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Link flags</b>              | Information about the link. Possible values are described in the “Link Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Physical info</b>           | Information about the physical interface.                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down. Value is in milliseconds.                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Current address</b>         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Hardware address</b>        | Media access control (MAC) address of the interface.                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Alternate link address</b>  | Backup link address.                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: <i>year-month-day hour:minute:second timezone (hour:minute:second ago)</i></b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                       | <b>detail extensive none</b> |
| <b>Input packets</b>           | Number of packets received on the physical interface.                                                                                                                                                                                                                                                                                                             | None specified               |
| <b>Output packets</b>          | Number of packets transmitted on the physical interface.                                                                                                                                                                                                                                                                                                          | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received and transmitted on the logical and physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface.</li> </ul> | <b>detail extensive</b>      |

**Table 58: show interfaces Output Fields for M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface (*continued*)**

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output              |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Input errors</b>      | <ul style="list-style-type: none"> <li>• <b>Errors</b>—Input errors on the interface.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Frames received smaller than the runt threshold.</li> <li>• <b>Giants</b>—Frames received larger than the giant threshold.</li> <li>• <b>Policed Discards</b>—Frames that the incoming packet match code discarded because they were not recognized or were not of interest. Usually, this field reports protocols that Junos does not support.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>                                                                                                    | <b>extensive</b>             |
| <b>Output errors</b>     | <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly, possibly once every 10 seconds, the cable, the remote system, or the interface is malfunctioning.</li> <li>• <b>Errors</b>—Sum of outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet dropped by the ASIC RED mechanism.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
| <b>Logical interface</b> | Name of the logical interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Index</b>             | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>      | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the logical interface; values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Encapsulation</b>     | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>inet</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>brief</b>                 |
| <b>Protocol</b>          | Protocol family configured on the logical interface (such as <b>iso</b> or <b>inet6</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>MTU</b>               | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |

Table 58: show interfaces Output Fields for M Series, MX Series, T Series, and PTX Series Routers Management Ethernet Interface (*continued*)

| Field Name       | Field Description                                                                                                                                                                | Level of Output       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Route table      | Route table in which this address exists. For example, <b>Route table:0</b> refers to inet.0.                                                                                    | detail extensive      |
| Flags            | Information about the protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | detail extensive none |
| Addresses, Flags | Information about address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.          | detail extensive none |
| Destination      | IP address of the remote side of the connection.                                                                                                                                 | detail extensive none |
| Local            | IP address of the logical interface.                                                                                                                                             | detail extensive none |
| Broadcast        | Broadcast address.                                                                                                                                                               | detail extensive none |
| Generation       | Unique number for use by Juniper Networks technical support only.                                                                                                                | detail extensive      |

## Sample Output

### show interfaces brief (Management Ethernet)

```

user@host> show interfaces fxp0 brief
Physical interface: fxp0, Enabled, Physical link is Up
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps

Logical interface fxp0.0
 Flags: SNMP-Traps Encapsulation: ENET2
 inet 192.168.70.143/21

```

### show interfaces (Management Ethernet)

```

user@host> show interfaces fxp0
Physical interface: fxp0, Enabled, Physical link is Up
 Interface index: 1, SNMP ifIndex: 1
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Half-Duplex
 Current address: 00:a0:a5:56:01:89, Hardware address: 00:a0:a5:56:01:89
 Last flapped : Never
 Input packets : 80804
 Output packets: 1105

Logical interface fxp0.0 (Index 2) (SNMP ifIndex 13)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred Is-Primary

```

Destination: 192.168.64/21, Local: 192.168.70.143,  
Broadcast: 192.168.71.255

### show interfaces (Management Ethernet [TX Matrix Plus Router])

```
user@host> show interfaces em0
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 17
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Current address: 00:80:f9:26:00:c0, Hardware address: 00:80:f9:26:00:c0
 Last flapped : Never
 Input packets : 1424
 Output packets: 5282

Logical interface em0.0 (Index 3) (SNMP ifIndex 18)
 Flags: SNMP-Traps Encapsulation: ENET2
 Input packets : 1424
 Output packets: 5282
 Protocol inet, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.168.178.0/25, Local: 192.168.178.11, Broadcast:
192.168.178.127
```

### show interfaces (Management Ethernet [PTX Series Packet Transport Routers])

```
user@host> show interfaces em0
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 0
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Current address: 00:80:f9:25:00:1b, Hardware address: 00:80:f9:25:00:1b
 Last flapped : Never
 Input packets : 212581
 Output packets: 71

Logical interface em0.0 (Index 3) (SNMP ifIndex 0)
 Flags: SNMP-Traps Encapsulation: ENET2
 Input packets : 212551
 Output packets: 71
 Protocol inet, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 192.168.3/24, Local: 192.168.3.30,
Broadcast: 192.168.3.255
```

### show interfaces detail (Management Ethernet)

```
user@host> show interfaces fxp0 detail
Physical interface: fxp0, Enabled, Physical link is Up
 Interface index: 1, SNMP ifIndex: 1, Generation: 0
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Half-Duplex
 Physical info : Unspecified
```



```

Hold-times : Up 0 ms, Down 0 ms
Current address: 00:a0:a5:56:01:89, Hardware address: 00:a0:a5:56:01:89
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 6484031
 Output bytes : 167503
 Input packets: 81008
 Output packets: 1110

Logical interface fxp0.0 (Index 2) (SNMP ifIndex 13) (Generation 1)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500, Generation: 6, Route table: 0
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.168.64/21, Local: 192.168.70.143,
 Broadcast: 192.168.71.255, Generation: 1

```

### show interfaces detail (Management Ethernet [TX Matrix Plus Router])

```

user@host> show interfaces em0 detail
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 17, Generation: 2
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:80:f9:26:00:c0, Hardware address: 00:80:f9:26:00:c0
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 124351
 Output bytes : 1353212
 Input packets: 1804
 Output packets: 5344
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

Logical interface em0.0 (Index 3) (SNMP ifIndex 18) (Generation 1)
 Flags: SNMP-Traps Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 117135
 Output bytes : 1331647
 Input packets: 1804
 Output packets: 5344
 Local statistics:
 Input bytes : 117135
 Output bytes : 1331647
 Input packets: 1804
 Output packets: 5344
 Protocol inet, MTU: 1500, Generation: 1, Route table: 0
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred Is-Primary

```

Destination: 192.168.178.0/25, Local: 192.168.178.11, Broadcast:  
192.168.178.127, Generation: 1

### show interfaces detail (Management Ethernet [PTX Packet Transport Routers])

```
user@host> show interfaces detail em0
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 0, Generation: 3
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,

 Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:80:f9:25:00:1b, Hardware address: 00:80:f9:25:00:1b
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 15255909
 Output bytes : 4608
 Input packets : 214753
 Output packets: 72
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0

 Logical interface em0.0 (Index 3) (SNMP ifIndex 0) (Generation 1)
 Flags: SNMP-Traps Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 14394630
 Output bytes : 3024
 Input packets : 214723
 Output packets: 72
 Local statistics:
 Input bytes : 14394630
 Output bytes : 3024
 Input packets : 214723
 Output packets: 72
 Protocol inet, MTU: 1500, Generation: 1, Route table: 0
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 192.168.3/24, Local: 192.168.3.30,
 Broadcast: 192.168.3.255, Generation: 1
```

### show interfaces extensive (Management Ethernet)

```
user@host> show interfaces fxp0 extensive
Physical interface: fxp0, Enabled, Physical link is Up
 Interface index: 1, SNMP ifIndex: 1, Generation: 0
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Half-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
```

```

Current address: 00:a0:a5:56:01:89, Hardware address: 00:a0:a5:56:01:89
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 6678904
 Output bytes : 169657
 Input packets: 83946
 Output packets: 1127
Input errors:
 Errors: 12, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
 Resource errors: 0

Logical interface fxp0.0 (Index 2) (SNMP ifIndex 13) (Generation 1)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 6, Route table: 0
Flags: Is-Primary
Addresses, Flags: Is-Preferred Is-Primary
 Destination: 192.168.64/21, Local: 192.168.70.143,
 Broadcast: 192.168.71.255, Generation: 1

```

#### show interfaces extensive (Management Ethernet [TX Matrix Plus Router])

```
user@host> show interfaces em0 extensive
```

```

Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 17, Generation: 2
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:80:f9:26:00:c0, Hardware address: 00:80:f9:26:00:c0
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 127120
 Output bytes : 1357414
 Input packets: 1843
 Output packets: 5372
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
 0, Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
 0

Logical interface em0.0 (Index 3) (SNMP ifIndex 18) (Generation 1)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:

```

```
Input bytes : 119748
Output bytes : 1335719
Input packets: 1843
Output packets: 5372
Local statistics:
Input bytes : 119748
Output bytes : 1335719
Input packets: 1843
Output packets: 5372
Protocol inet, MTU: 1500, Generation: 1, Route table: 0
Flags: Is-Primary
Addresses, Flags: Is-Preferred Is-Primary
Destination: 192.168.178.0/25, Local: 192.168.178.11, Broadcast:
192.168.178.127, Generation: 1
```

### show interfaces extensive (Management Ethernet [PTX Series Packet Transport Routers])

```
user@host> show interfaces extensive em0
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 0, Generation: 3
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,

 Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:80:f9:25:00:1b, Hardware address: 00:80:f9:25:00:1b
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 15236459
 Output bytes : 4608
 Input packets: 214482
 Output packets: 72
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
 Resource errors: 0

 Logical interface em0.0 (Index 3) (SNMP ifIndex 0) (Generation 1)
 Flags: SNMP-Traps Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 14376264
 Output bytes : 3024
 Input packets: 214452
 Output packets: 72
 Local statistics:
 Input bytes : 14376264
 Output bytes : 3024
 Input packets: 214452
 Output packets: 72
```

```

Protocol inet, MTU: 1500, Generation: 1, Route table: 0
Flags: Is-Primary
Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 192.168.3/24, Local: 192.168.3.30,
 Broadcast: 192.168.3.255, Generation: 1

```

### show interfaces brief (Management Ethernet)

```

user@host> show interfaces fxp1 brief
Physical interface: fxp1, Enabled, Physical link is Up
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps

Logical interface fxp1.0
 Flags: SNMP-Traps Encapsulation: ENET2
 inet 10.0.0.4/8
 inet6 fe80::200:ff:fe00:4/64
 fec0::10:0:0:4/64
 tnp 4

```

### show interfaces brief (Management Ethernet [TX Matrix Plus Router])

```

user@host> show interfaces em0 brief
Physical interface: em0, Enabled, Physical link is Up
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps

Logical interface em0.0
 Flags: SNMP-Traps Encapsulation: ENET2
 inet 192.168.178.11/25

```

### show interfaces brief (Management Ethernet [PTX Series Packet Transport Routers])

```

user@host> show interfaces em0 brief
Physical interface: em0, Enabled, Physical link is Up
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,

 Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps

Logical interface em0.0
Flags: SNMP-Traps Encapsulation: ENET2
inet 192.168.3.30/24

```

```

root@absolutely> show interfaces em0 terse
Interface Admin Link Proto Local Remote
em0 up up
em0.0 up up inet 192.168.3.30/24

```

### show interfaces (Internal Ethernet)

```

user@host> show interfaces fxp1
Physical interface: fxp1, Enabled, Physical link is Up
 Interface index: 2, SNMP ifIndex: 2
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps

```

```
Link type : Full-Duplex
Current address: 02:00:00:00:00:04, Hardware address: 02:00:00:00:00:04
Last flapped : Never
 Input packets : 30655
 Output packets: 33323

Logical interface fxp1.0 (Index 3) (SNMP ifIndex 14)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 10/8, Local: 10.0.0.4, Broadcast: 10.255.255.255
 Protocol inet6, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::200:ff:fe00:4
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: fec0::/64, Local: fec0::10:0:0:4
 Protocol tnp, MTU: 1500
 Flags: Primary, Is-Primary
 Addresses
 Local: 4
```

#### show interfaces (Internal Ethernet [TX Matrix Plus Router])

```
user@host> show interfaces ixgbe0
Physical interface: ixgbe0, Enabled, Physical link is Up
 Interface index: 2, SNMP ifIndex: 116
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Current address: 02:00:00:22:00:04, Hardware address: 02:00:00:22:00:04
 Last flapped : Never
 Input packets : 2301738
 Output packets: 3951155

Logical interface ixgbe0.0 (Index 4) (SNMP ifIndex 117)
 Flags: SNMP-Traps Encapsulation: ENET2
 Input packets : 2301595
 Output packets: 3951155
 Protocol inet, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: 10/8, Local: 10.34.0.4, Broadcast: 10.255.255.255
 Addresses, Flags: Primary Is-Default Is-Preferred Is-Primary
 Destination: 128/2, Local: 162.0.0.4, Broadcast: 191.255.255.255
 Protocol inet6, MTU: 1500
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::200:ff:fe22:4
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: fec0::/64, Local: fec0::a:22:0:4
 Protocol tnp, MTU: 1500
 Flags: Primary, Is-Primary
 Addresses
 Local: 0x22000004
```

#### show interfaces detail (Internal Ethernet)

```
user@host> show interfaces fxp1 detail
```

```

Physical interface: fxp1, Enabled, Physical link is Up
 Interface index: 2, SNMP ifIndex: 2, Generation: 1
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 02:00:00:00:00:04, Hardware address: 02:00:00:00:00:04
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 2339969
 Output bytes : 15880707
 Input packets : 30758
 Output packets: 33443

Logical interface fxp1.0 (Index 3) (SNMP ifIndex 14) (Generation 2)
 Flags: SNMP-Traps Encapsulation: ENET2
 Protocol inet, MTU: 1500, Generation: 7, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: 10/8, Local: 10.0.0.4, Broadcast: 10.255.255.255,
 Generation: 3
 Protocol inet6, MTU: 1500, Generation: 8, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::200:ff:fe00:4,
 Broadcast: Unspecified, Generation: 5
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: fec0::/64, Local: fec0::10:0:0:4, Broadcast: Unspecified,
 Generation: 7
 Protocol tnp, MTU: 1500, Generation: 9, Route table: 1
 Flags: Primary, Is-Primary
 Addresses, Flags: None
 Destination: Unspecified, Local: 4, Broadcast: Unspecified,
 Generation: 8

```

#### show interfaces detail (Internal Ethernet [TX Matrix Plus Router])

```

user@host> show interfaces ixgbe0 detail
Physical interface: ixgbe0, Enabled, Physical link is Up
 Interface index: 2, SNMP ifIndex: 116, Generation: 3
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 02:00:00:22:00:04, Hardware address: 02:00:00:22:00:04
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 238172825
 Output bytes : 1338948955
 Input packets : 2360984
 Output packets: 4061512

```

```

IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0

Logical interface ixgbe0.0 (Index 4) (SNMP ifIndex 117) (Generation 2)
 Flags: SNMP-Traps Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 228720309
 Output bytes : 1261387447
 Input packets: 2360841
 Output packets: 4061512
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 228720309
 Output bytes : 1261387447
 Input packets: 2360841
 Output packets: 4061512
 Protocol inet, MTU: 1500, Generation: 2, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: 10/8, Local: 10.34.0.4, Broadcast: 10.255.255.255, Generation:
2
 Addresses, Flags: Primary Is-Default Is-Preferred Is-Primary
 Destination: 128/2, Local: 162.0.0.4, Broadcast: 191.255.255.255,
Generation: 3
 Protocol inet6, MTU: 1500, Generation: 3, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::200:ff:fe22:4
Generation: 4
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: fec0::/64, Local: fec0::a:22:0:4
 Protocol tnp, MTU: 1500, Generation: 5
 Generation: 4, Route table: 1
 Flags: Primary, Is-Primary
 Addresses, Flags: None
 Destination: Unspecified, Local: 0x22000004, Broadcast: Unspecified,
Generation: 6

```

#### show interfaces extensive (internal Ethernet)

```

user@host> show interfaces fxp1 extensive
Physical interface: fxp1, Enabled, Physical link is Up
 Interface index: 2, SNMP ifIndex: 2, Generation: 1
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: 100mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 02:00:00:00:00:04, Hardware address: 02:00:00:00:00:04
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never

```



```

Traffic statistics:
Input bytes : 2349897
Output bytes : 15888605
Input packets: 30896
Output packets: 33607
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0

Logical interface fxp1.0 (Index 3) (SNMP ifIndex 14) (Generation 2)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 7, Route table: 1
Flags: Is-Primary
Addresses, Flags: Is-Default Is-Preferred Is-Primary
Destination: 10/8, Local: 10.0.0.4, Broadcast: 10.255.255.255,
Generation: 3
Protocol inet6, MTU: 1500, Generation: 8, Route table: 1
Flags: Is-Primary
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::200:ff:fe00:4,
Broadcast: Unspecified, Generation: 5
Addresses, Flags: Is-Default Is-Preferred Is-Primary
Destination: fec0::/64, Local: fec0::10:0:0:4, Broadcast: Unspecified,
Generation: 7
Protocol tnp, MTU: 1500, Generation: 9, Route table: 1
Flags: Primary, Is-Primary
Addresses, Flags: None
Destination: Unspecified, Local: 4, Broadcast: Unspecified,
Generation: 8

```

#### show interfaces extensive (internal Ethernet [TX Matrix Plus Router])

```

user@host> show interfaces ixgbe0 extensive
Physical interface: ixgbe0, Enabled, Physical link is Up
Interface index: 2, SNMP ifIndex: 116, Generation: 3
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
Speed: 1000mbps
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: 02:00:00:22:00:04, Hardware address: 02:00:00:22:00:04
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
Input bytes : 242730780
Output bytes : 1348312269
Input packets: 2398737
Output packets: 4133510
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:

```

```

0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0

```

```

Logical interface ixgbe0.0 (Index 4) (SNMP ifIndex 117) (Generation 2)
 Flags: SNMP-Traps Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 233127252
 Output bytes : 1269350897
 Input packets: 2398594
 Output packets: 4133510
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 233127252
 Output bytes : 1269350897
 Input packets: 2398594
 Output packets: 4133510
 Protocol inet, MTU: 1500, Generation: 2, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: 10/8, Local: 10.34.0.4, Broadcast: 10.255.255.255, Generation:
2
 Addresses, Flags: Primary Is-Default Is-Preferred Is-Primary
 Destination: 128/2, Local: 162.0.0.4, Broadcast: 191.255.255.255,
Generation: 3
 Protocol inet6, MTU: 1500, Generation: 3, Route table: 1
 Flags: Is-Primary
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::200:ff:fe22:4
Generation: 4
 Addresses, Flags: Is-Default Is-Preferred Is-Primary
 Destination: fec0::/64, Local: fec0::a:22:0:4
 Protocol tnp, MTU: 1500, Generation: 5
 Generation: 4, Route table: 1
 Flags: Primary, Is-Primary
 Addresses, Flags: None
 Destination: Unspecified, Local: 0x22000004, Broadcast: Unspecified,
Generation: 6

```

## show interfaces (PPPoE)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces pp0.logical &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | (M120 routers, M320 routers, and MX Series routers only). Display status information about the PPPoE interface.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>pp0.logical</b>—Display standard status information about the PPPoE interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about PPPoE interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display PPPoE interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (PPPoE) on page 1183</a></p> <p><a href="#">show interfaces (PPPoE over Aggregated Ethernet) on page 1183</a></p> <p><a href="#">show interfaces brief (PPPoE) on page 1183</a></p> <p><a href="#">show interfaces detail (PPPoE) on page 1184</a></p> <p><a href="#">show interfaces extensive (PPPoE on M120 and M320 Routers) on page 1185</a></p>                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 59 on page 1177 lists the output fields for the <b>show interfaces (PPPoE)</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                        |

**Table 59: show interfaces (PPPoE) Output Fields**

| Field Name                | Field Description                                                                                                                                            | Level of Output              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                              |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                              | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | All levels                   |
| <b>Interface index</b>    | Physical interface index number, which reflects its initialization sequence.                                                                                 | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                | <b>detail extensive none</b> |

Table 59: show interfaces (PPPoE) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Generation</b>              | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>Type</b>                    | Physical interface type (PPPoE).                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels              |
| <b>Link-level type</b>         | Encapsulation on the physical interface (PPPoE).                                                                                                                                                                                                                                                                                                                                                                                                      | All levels              |
| <b>MTU</b>                     | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Clocking</b>                | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                | All levels              |
| <b>Speed</b>                   | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                              | All levels              |
| <b>Device flags</b>            | Information about the physical device. Possible values are described in the "Device Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                             | All levels              |
| <b>Interface flags</b>         | Information about the interface. Possible values are described in the "Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                | All levels              |
| <b>Link type</b>               | Physical interface link type: <b>full duplex</b> or <b>half duplex</b> .                                                                                                                                                                                                                                                                                                                                                                              | All levels              |
| <b>Link flags</b>              | Information about the interface. Possible values are described in the "Link Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                     | All levels              |
| <b>Input rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                     | None specified          |
| <b>Output rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                           | None specified          |
| <b>Physical Info</b>           | Physical interface information.                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Current address</b>         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Hardware address</b>        | MAC address of the hardware.                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Alternate link address</b>  | Backup address of the link.                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received and transmitted on the physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b> |

Table 59: show interfaces (PPPoE) Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IPv6 transit statistics  | <p>Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</p> <p><b>NOTE:</b> These fields include dropped traffic and exception traffic, as those fields are not separately defined.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive      |
| Input errors             | <p>Input errors on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of B chip Tx drops and IXP Tx net transmit drops.</li> </ul>                                                                                                            | extensive             |
| Output errors            | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b> —Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), then the cable, the far-end system, or the PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of B chip Tx drops and IXP Tx net transmit drops.</li> </ul> | extensive             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| Logical interface        | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels            |
| Index                    | Logical interface index number (which reflects its initialization sequence).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive none |
| SNMP ifIndex             | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive none |
| Generation               | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | detail extensive      |

Table 59: show interfaces (PPPoE) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Flags</b>                   | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels              |
| <b>Encapsulation</b>           | Type of encapsulation configured on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels              |
| <b>PPP parameters</b>          | PPP status: <ul style="list-style-type: none"> <li>• LCP restart timer—Length of time (in milliseconds) between successive Link Control Protocol (LCP) configuration requests.</li> <li>• NCP restart timer—Length of time (in milliseconds) between successive Network Control Protocol (NCP) configuration requests.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail</b>           |
| <b>PPPoE</b>                   | PPPoE status: <ul style="list-style-type: none"> <li>• <b>State</b>—State of the logical interface (<b>up</b> or <b>down</b>).</li> <li>• <b>Session ID</b>—PPPoE session ID.</li> <li>• <b>Service name</b>—Type of service required. Can be used to indicate an Internet service provider (ISP) name or a class or quality of service.</li> <li>• <b>Configured AC name</b>—Configured access concentrator name.</li> <li>• <b>Auto-reconnect timeout</b>—Time after which to try to reconnect after a PPPoE session is terminated, in seconds.</li> <li>• <b>Idle Timeout</b>—Length of time (in seconds) that a connection can be idle before disconnecting.</li> <li>• <b>Underlying interface</b>—Interface on which PPPoE is running.</li> </ul> | All levels              |
| <b>Link</b>                    | Name of the physical interfaces for member links in an aggregated Ethernet bundle for a PPPoE over aggregated Ethernet configuration. PPPoE traffic goes out on these interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <b>Traffic statistics</b>      | Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b> |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. <p><b>NOTE:</b> The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                           | <b>detail extensive</b> |
| <b>Local statistics</b>        | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |

Table 59: show interfaces (PPPoE) Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b>   | <p>Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize.</p> <p><b>NOTE:</b> The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Keepalive settings</b>   | <p>(PPP and HDLC) Configured settings for keepalives.</p> <ul style="list-style-type: none"> <li><b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li><b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li><b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul>                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Keepalive statistics</b> | <p>(PPP and HDLC) Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul> <p>(MX Series routers with MPCs/MICs) When an MX Series router with MPCs/MICs is using PPP fast keepalive for a PPP link, the display does not include the number of keepalive packets received or sent, or the amount of time since the router received or sent the last keepalive packet.</p> | <b>detail extensive</b>      |
| <b>Input packets</b>        | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | None specified               |
| <b>Output packets</b>       | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | None specified               |
| <b>LCP state</b>            | <p>(PPP) Link Control Protocol state.</p> <ul style="list-style-type: none"> <li><b>Conf-ack-received</b>—Acknowledgement was received.</li> <li><b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li><b>Conf-req-sent</b>—Request was sent.</li> <li><b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li><b>Not-configured</b>—LCP is not configured on the interface.</li> <li><b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | none <b>detail extensive</b> |

Table 59: show interfaces (PPPoE) Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output              |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>NCP state</b>              | (PPP) Network Control Protocol state.<br><br><ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>CHAP state</b>             | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction.<br><br><ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>none detail extensive</b> |
| <b>Protocol</b>               | Protocol family configured on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b> | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>brief</b>                 |
| <b>MTU</b>                    | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Generation</b>             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Route table</b>            | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Flags</b>                  | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>       | Information about the addresses configured for the protocol family. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Destination</b>            | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Local</b>                  | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Broadcast</b>              | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |



## Sample Output

### show interfaces (PPPoE)

```

user@host> show interfaces pp0
Physical interface: pp0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 24
 Type: PPPoE, Link-level type: PPPoE, MTU: 1532
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link type : Full-Duplex
 Link flags : None
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)

Logical interface pp0.0 (Index 72) (SNMP ifIndex 72)
 Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
 PPPoE:
 State: SessionDown, Session ID: None,
 Service name: None, Configured AC name: sapphire,
 Auto-reconnect timeout: 100 seconds, Idle timeout: Never,
 Underlying interface: at-5/0/0.0 (Index 70)
 Input packets : 0
 Output packets: 0
 LCP state: Not-configured
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Closed
 Protocol inet, MTU: 100
 Flags: User-MTU, Negotiate-Address

```

### show interfaces (PPPoE over Aggregated Ethernet)

```

user@host> show interfaces pp0.1073773821
Logical interface pp0.1073773821 (Index 80) (SNMP ifIndex 32584)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
 PPPoE:
 State: SessionUp, Session ID: 1,
 Session AC name: alcor, Remote MAC address: 00:10:94:00:00:01,
 Underlying interface: demux0.100 (Index 88)
 Link:
 ge-1/0/0.32767
 ge-1/0/1.32767
 Input packets : 6
 Output packets: 6
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
 CHAP state: Closed
 PAP state: Success
 Protocol inet, MTU: 1500
 Flags: Sendbroadcast-pkt-to-re
 Addresses, Flags: Is-Primary
 Local: 45.63.24.1

```

### show interfaces brief (PPPoE)

```

user@host> show interfaces pp0 brief
Physical interface: pp0, Enabled, Physical link is Up
 Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified
 Device flags : Present Running

```

Interface flags: Point-To-Point SNMP-Traps

Logical interface pp0.0

Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE  
PPPoE:

State: SessionDown, Session ID: None,  
Service name: None, Configured AC name: sapphire,  
Auto-reconnect timeout: 100 seconds, Idle timeout: Never,  
Underlying interface: at-5/0/0.0 (Index 70)

inet

### show interfaces detail (PPPoE)

user@host> show interfaces pp0 detail

Physical interface: pp0, Enabled, Physical link is Up

Interface index: 128, SNMP ifIndex: 24, Generation: 9

Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified

Device flags : Present Running

Interface flags: Point-To-Point SNMP-Traps

Link type : Full-Duplex

Link flags : None

Physical info : Unspecified

Hold-times : Up 0 ms, Down 0 ms

Current address: Unspecified, Hardware address: Unspecified

Alternate link address: Unspecified

Statistics last cleared: Never

Traffic statistics:

|                 |   |       |
|-----------------|---|-------|
| Input bytes :   | 0 | 0 bps |
| Output bytes :  | 0 | 0 bps |
| Input packets:  | 0 | 0 pps |
| Output packets: | 0 | 0 pps |

Logical interface pp0.0 (Index 72) (SNMP ifIndex 72) (Generation 14)

Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE  
PPPoE:

State: SessionDown, Session ID: None,  
Service name: None, Configured AC name: sapphire,  
Auto-reconnect timeout: 100 seconds, Idle timeout: Never,  
Underlying interface: at-5/0/0.0 (Index 70)

Traffic statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

Local statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

Transit statistics:

|                 |   |       |
|-----------------|---|-------|
| Input bytes :   | 0 | 0 bps |
| Output bytes :  | 0 | 0 bps |
| Input packets:  | 0 | 0 pps |
| Output packets: | 0 | 0 pps |

LCP state: Not-configured

NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,  
mpls: Not-configured

CHAP state: Closed

Protocol inet, MTU: 100, Generation: 14, Route table: 0

Flags: User-MTU, Negotiate-Address

## show interfaces extensive (PPPoE on M120 and M320 Routers)

```

user@host> show interfaces pp0 extensive
Physical interface: pp0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 93, Generation: 129
 Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps
 Link type : Full-Duplex
 Link flags : None
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: Unspecified, Hardware address: Unspecified
 Alternate link address: Unspecified
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 972192 0 bps
 Output bytes : 975010 0 bps
 Input packets : 1338 0 pps
 Output packets: 1473 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0,
 Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0

Logical interface pp0.0 (Index 69) (SNMP ifIndex 96) (Generation 194)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
 PPPoE:
 State: SessionUp, Session ID: 26,
 Session AC name: None, AC MAC address: 00:17:cb:48:c8:12,
 Service name: None, Configured AC name: None,
 Auto-reconnect timeout: Never, Idle timeout: Never,
 Underlying interface: ge-3/0/1.0 (Index 67)
 Traffic statistics:
 Input bytes : 252
 Output bytes : 296
 Input packets : 7
 Output packets: 8
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Local statistics:
 Input bytes : 252
 Output bytes : 296
 Input packets : 7
 Output packets: 8
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps

```

```
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
 Input : 1 (last seen 00:00:00 ago)
 Output: 1 (last sent 00:00:03 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Closed
PAP state: Closed
 Protocol inet, MTU: 1492, Generation: 171, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 12.12.12.2, Local: 12.12.12.1, Broadcast: Unspecified,
Generation: 206
```

## show interfaces (PTX Series Packet Transport Routers)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces et-<i>fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 8.0.</p> <p>Command introduced in Junos OS Release 12.1 for PTX Series Packet Transport Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | (PTX Series Packet Transport Routers only) Display status information about the specified Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>et-<i>fpc/pic/port</i></b>—Display standard information about the specified Ethernet interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b> —(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces brief (PTX5000 Packet Transport Router) on page 1197</a></p> <p><a href="#">show interfaces extensive (PTX5000 Packet Transport Router) on page 1197</a></p> <p><a href="#">show interfaces terse (PTX5000 Packet Transport Router) on page 1198</a></p>                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | See <a href="#">Table 60 on page 1188</a> for the output fields for the <b>show interfaces</b> (PTX Series Packet Transport Routers) command.                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 60: show interfaces PTX Series Output Fields

| Field Name                | Field Description                                                                                                                                                         | Level of Output              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                           |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                           | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .               | All levels                   |
| <b>Interface index</b>    | Index number of the physical interface, which reflects its initialization sequence.                                                                                       | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                             | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                         | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                       | All levels                   |
| <b>MTU</b>                | Maximum transmission unit size on the physical interface.                                                                                                                 | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                  | All levels                   |
| <b>BPDU Error</b>         | Bridge protocol data unit (BPDU) errors (if any).                                                                                                                         | All levels                   |
| <b>MAC-Rewrite</b>        | MAC Rewrite errors (if any).                                                                                                                                              | All levels                   |
| <b>Loopback</b>           | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                            | All levels                   |
| <b>Source filtering</b>   | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                              | All levels                   |
| <b>Flow control</b>       | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                  | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .    | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Links Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .             | All levels                   |
| <b>CoS queues</b>         | Number of CoS queues configured.                                                                                                                                          | <b>detail extensive none</b> |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                       | <b>detail extensive</b>      |
| <b>Current address</b>    | Configured MAC address.                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Hardware address</b>   | Hardware MAC address.                                                                                                                                                     | <b>detail extensive none</b> |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p><b>NOTE:</b> <b>Input bytes</b> and <b>output bytes</b> are counted as Layer 3 packet length.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored by configuring the <b>ignore-l3-incompletes</b> statement.</li> </ul> <p><b>NOTE:</b> The L3 incompletes field is <i>not</i> supported on PTX Series Packet Transport Routers.</p> <ul style="list-style-type: none"> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b>            | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues</b>            | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Queue counters (Egress)</b>  | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Ingress queues</b>           | Total number of ingress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |
| <b>Queue counters (Ingress)</b> | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>extensive</b>        |



Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Active alarms and Active defects</b> | <p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> <li>• <b>LOCAL-FAULT</b>—Occurs when a failure in the incoming signal is detected.</li> <li>• <b>REMOTE-FAULT</b>—Occurs when the far-end system sends a signal that it is detecting a failure in the received signal.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>MAC statistics</b>                   | <p><b>Receive and Transmit</b> statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> <li>• <b>Total octets and total packets</b>—Total number of octets and packets.</li> <li>• <b>Unicast packets, Broadcast packets, and Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of frames that exceed 1518 octets.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runs (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul> | <b>extensive</b>             |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Filter statistics</b> | <p><b>Receive</b> and <b>Transmit</b> statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> <li>• <b>Input packet count</b>—Number of packets received from the MAC hardware that the filter processed.</li> <li>• <b>Input packet rejects</b>—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address.</li> <li>• <b>Input DA rejects</b>—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the router from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local router (which the router is rejecting).</li> <li>• <b>Input SA rejects</b>—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect.</li> <li>• <b>Output packet count</b>—Number of packets that the filter has given to the MAC hardware.</li> <li>• <b>Output packet pad count</b>—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured.</li> <li>• <b>Output packet error count</b>—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment.</li> <li>• <b>CAM destination filters, CAM source filters</b>—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0.</li> </ul> | <b>extensive</b> |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information            | <p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner:</b> <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is <b>None</b>. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> </ul> </li> <li>• <b>Local resolution</b>—Information from the link partner: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>   | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Index</b>             | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>      | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                       |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>VLAN-Tag</b>                | <p>Rewrite profile applied to incoming or outgoing frames on the outer (<b>Out</b>) VLAN tag or for both the outer and inner (<b>In</b>) VLAN tags.</p> <ul style="list-style-type: none"> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>pop</b>—The outer VLAN tag of the incoming frame is removed.</li> <li>• <b>swap</b>—The outer VLAN tag of the incoming frame is overwritten with the user-specified VLAN tag information.</li> <li>• <b>push</b>—An outer VLAN tag is pushed in front of the existing VLAN tag.</li> <li>• <b>push-push</b>—Two VLAN tags are pushed in from the incoming frame.</li> <li>• <b>swap-push</b>—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame.</li> <li>• <b>swap-swap</b>—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user-specified VLAN tag value.</li> <li>• <b>pop-swap</b>—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.</li> <li>• <b>pop-pop</b>—Both the outer and inner VLAN tags of the incoming frame are removed.</li> </ul> | <b>brief detail extensive</b><br>none |
| <b>Demux</b>                   | <p>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</p> <ul style="list-style-type: none"> <li>• Source Family Inet</li> <li>• Destination Family Inet</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> none          |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                            |
| <b>Protocol</b>                | Protocol family. Possible values are described in the “Protocol Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> none          |
| <b>MTU</b>                     | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> none          |
| <b>Maximum labels</b>          | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> none          |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface set</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface set.</li> </ul> <p><b>NOTE:</b> <b>Input bytes</b> and <b>output bytes</b> are counted as Layer 3 packet length.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>               |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>                      |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>                      |

Table 60: show interfaces PTX Series Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                    | Level of Output              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b>       | Number and rate of bytes and packets transiting the switch.                                                                                                                                          | <b>extensive</b>             |
| <b>Generation</b>               | Unique number for use by Juniper Networks technical support only.                                                                                                                                    | <b>detail extensive</b>      |
| <b>Route Table</b>              | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table inet.0.                                                                             | <b>detail extensive none</b> |
| <b>Flags</b>                    | Information about protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                          | <b>detail extensive</b>      |
| <b>Donor interface</b>          | (Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.                                                                                                 | <b>detail extensive none</b> |
| <b>Preferred source address</b> | (Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.                                        | <b>detail extensive none</b> |
| <b>Input Filters</b>            | Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parentheses next to all interfaces.  | <b>detail extensive</b>      |
| <b>Output Filters</b>           | Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parentheses next to all interfaces. | <b>detail extensive</b>      |
| <b>Mac-Validate Failures</b>    | Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.                                           | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>         | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                           | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b>   | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                             | <b>brief</b>                 |
| <b>Flags</b>                    | Information about flags (possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                       | <b>detail extensive none</b> |
| <b>Destination</b>              | IP address of the remote side of the connection.                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Local</b>                    | IP address of the logical interface.                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Broadcast</b>                | Broadcast address of the logical interlace.                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>               | Unique number for use by Juniper Networks technical support only.                                                                                                                                    | <b>detail extensive</b>      |

## Sample Output

### show interfaces brief (PTX5000 Packet Transport Router)

```

user@host> show interfaces brief et-7/0/0
Physical interface: et-7/0/0, Enabled, Physical link is Up
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Loopback: Disabled, Source
 filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None

```

### show interfaces extensive (PTX5000 Packet Transport Router)

```

user@host> show interfaces et-7/0/0 extensive
Physical interface: et-7/0/0, Enabled, Physical link is Up
 Interface index: 168, SNMP ifIndex: 501, Generation: 171
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, BPDU Error: None,
 MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled, Flow
 control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 88:e0:f3:3b:de:43, Hardware address: 88:e0:f3:3b:de:43
 Last flapped : 2012-01-18 11:48:24 PST (01:51:00 ago)
 Statistics last cleared: 2012-01-18 13:38:54 PST (00:00:30 ago)
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
 Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
 Egress queues: 8 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 0 0 0

 Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control

```

```

Active alarms : None
Active defects : None
MAC statistics:
 Total octets Receive Transmit
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
 Negotiation status: Incomplete
Packet Forwarding Engine configuration:
 Destination slot: 7
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort % bps % usec low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces terse (PTX5000 Packet Transport Router)

```

user@host> show interfaces terse
Interface Admin Link Proto Local Remote
et-2/0/0 up up
et-2/0/1 up up
et-2/0/2 up up
et-2/0/3 up up
et-2/0/4 up up
et-2/0/5 up down
et-2/0/6 up up
et-2/0/7 up up
et-2/0/8 up up
et-2/0/9 up down
et-2/0/10 up up
et-2/0/11 up up
et-2/0/12 up up
et-2/0/13 up down
et-2/0/14 up up
et-2/0/15 up up

```



|                |    |      |              |
|----------------|----|------|--------------|
| et-2/0/16      | up | up   |              |
| et-2/0/17      | up | down |              |
| et-2/0/18      | up | down |              |
| et-2/0/19      | up | up   |              |
| et-2/0/20      | up | down |              |
| et-2/0/21      | up | up   |              |
| et-2/0/22      | up | down |              |
| et-2/0/23      | up | up   |              |
| et-2/1/0       | up | up   |              |
| et-2/1/1       | up | up   |              |
| et-2/1/2       | up | up   |              |
| et-2/1/3       | up | up   |              |
| et-2/1/4       | up | up   |              |
| et-2/1/5       | up | up   |              |
| et-2/1/6       | up | up   |              |
| et-2/1/7       | up | up   |              |
| et-2/1/8       | up | up   |              |
| et-2/1/9       | up | up   |              |
| et-2/1/10      | up | up   |              |
| et-2/1/11      | up | up   |              |
| et-2/1/12      | up | up   |              |
| et-2/1/13      | up | up   |              |
| et-2/1/14      | up | up   |              |
| et-2/1/15      | up | up   |              |
| et-2/1/16      | up | up   |              |
| et-2/1/17      | up | up   |              |
| et-2/1/18      | up | up   |              |
| et-2/1/19      | up | up   |              |
| et-2/1/20      | up | up   |              |
| et-2/1/21      | up | up   |              |
| et-2/1/22      | up | up   |              |
| et-2/1/23      | up | up   |              |
| et-5/0/0       | up | up   |              |
| et-5/0/0.0     | up | up   | ccc          |
| et-5/0/0.32767 | up | up   | multiservice |
| et-5/0/1       | up | up   |              |
| et-5/0/2       | up | up   |              |
| et-5/0/3       | up | down |              |
| et-5/0/4       | up | down |              |
| et-5/0/5       | up | up   |              |
| et-5/0/5.0     | up | up   | ccc          |
| et-5/0/5.32767 | up | up   | multiservice |
| et-5/0/6       | up | up   |              |
| et-5/0/7       | up | up   |              |
| et-5/0/8       | up | down |              |
| et-5/0/9       | up | up   |              |
| et-5/0/10      | up | up   |              |
| et-5/0/11      | up | up   |              |
| et-5/0/12      | up | up   |              |
| et-5/0/13      | up | down |              |
| et-5/0/14      | up | down |              |
| et-5/0/15      | up | up   |              |
| et-5/0/16      | up | up   |              |
| et-5/0/17      | up | up   |              |
| et-5/0/18      | up | up   |              |
| et-5/0/19      | up | up   |              |
| et-5/0/20      | up | down |              |
| et-5/0/21      | up | down |              |
| et-5/0/22      | up | up   |              |
| et-5/0/23      | up | up   |              |
| et-5/1/0       | up | up   |              |

|           |    |      |       |                                                 |
|-----------|----|------|-------|-------------------------------------------------|
| et-5/1/1  | up | up   |       |                                                 |
| et-7/0/0  | up | up   |       |                                                 |
| et-7/0/1  | up | up   |       |                                                 |
| et-7/0/2  | up | up   |       |                                                 |
| et-7/0/3  | up | up   |       |                                                 |
| et-7/0/4  | up | up   |       |                                                 |
| et-7/0/5  | up | up   |       |                                                 |
| et-7/0/6  | up | up   |       |                                                 |
| et-7/0/7  | up | up   |       |                                                 |
| et-7/0/8  | up | up   |       |                                                 |
| et-7/0/9  | up | up   |       |                                                 |
| et-7/0/10 | up | down |       |                                                 |
| et-7/0/11 | up | down |       |                                                 |
| et-7/0/12 | up | down |       |                                                 |
| et-7/0/13 | up | down |       |                                                 |
| et-7/0/14 | up | down |       |                                                 |
| et-7/0/15 | up | down |       |                                                 |
| et-7/0/16 | up | down |       |                                                 |
| et-7/0/17 | up | down |       |                                                 |
| et-7/0/18 | up | down |       |                                                 |
| et-7/0/19 | up | down |       |                                                 |
| et-7/0/20 | up | down |       |                                                 |
| et-7/0/21 | up | down |       |                                                 |
| et-7/0/22 | up | down |       |                                                 |
| et-7/0/23 | up | down |       |                                                 |
| dsc       | up | up   |       |                                                 |
| em0       | up | up   |       |                                                 |
| em0.0     | up | up   | inet  | 192.168.177.61/25                               |
| gre       | up | up   |       |                                                 |
| ipip      | up | up   |       |                                                 |
| ixgbe0    | up | up   |       |                                                 |
| ixgbe0.0  | up | up   | inet  | 10.0.0.4/8                                      |
|           |    |      |       | 128.0.0.1/2                                     |
|           |    |      |       | 128.0.0.4/2                                     |
|           |    |      | inet6 | fe80::200:ff:fe00:4/64                          |
|           |    |      |       | fec0::a:0:0:4/64                                |
|           |    |      | tnp   | 0x4                                             |
| ixgbe1    | up | up   |       |                                                 |
| ixgbe1.0  | up | up   | inet  | 10.0.0.4/8                                      |
|           |    |      |       | 128.0.0.1/2                                     |
|           |    |      |       | 128.0.0.4/2                                     |
|           |    |      | inet6 | fe80::200:1ff:fe00:4/64                         |
|           |    |      |       | fec0::a:0:0:4/64                                |
|           |    |      | tnp   | 0x4                                             |
| lo0       | up | up   |       |                                                 |
| lo0.0     | up | up   | inet  | 10.255.177.61 --> 0/0                           |
|           |    |      |       | 127.0.0.1 --> 0/0                               |
|           |    |      | iso   |                                                 |
|           |    |      |       | 47.0005.80ff.f800.0000.0108.0001.0102.5517.7061 |
|           |    |      | inet6 | abcd::10:255:177:61                             |
|           |    |      |       | fe80::ee9e:cd0f:fc02:b01e                       |
| lo0.16384 | up | up   | inet  | 127.0.0.1 --> 0/0                               |
| lo0.16385 | up | up   | inet  |                                                 |
| lsi       | up | up   |       |                                                 |
| mtun      | up | up   |       |                                                 |
| pimd      | up | up   |       |                                                 |
| pime      | up | up   |       |                                                 |
| tap       | up | up   |       |                                                 |

## show interfaces (SONET/SDH)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>so-fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified SONET/SDH interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b><i>so-fpc/pic/port</i></b>—Display standard information about the specified SONET/SDH interface.</p> <p><b><i>brief   detail   extensive   terse</i></b>—(Optional) Display the specified level of output.</p> <p><b><i>descriptions</i></b>—(Optional) Display interface description strings.</p> <p><b><i>media</i></b>—(Optional) Display media-specific information about network interfaces.</p> <p><b><i>snmp-index snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b><i>statistics</i></b>—(Optional) Display static interface statistics.</p>                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>SONET/SDH Interfaces Overview</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (SDH Mode, PPP) on page 1214</a></p> <p><a href="#">show interfaces brief (SDH Mode, PPP) on page 1215</a></p> <p><a href="#">show interfaces detail (SDH Mode, PPP) on page 1215</a></p> <p><a href="#">show interfaces extensive (SDH Mode, PPP) on page 1216</a></p> <p><a href="#">show interfaces brief (SONET Mode, Frame Relay) on page 1218</a></p> <p><a href="#">show interfaces (SONET Mode, Frame Relay) on page 1218</a></p> <p><a href="#">show interfaces detail (SONET Mode, Frame Relay) on page 1219</a></p> <p><a href="#">show interfaces extensive (SONET Mode, Frame Relay) on page 1221</a></p> <p><a href="#">show interfaces extensive (OC768-over-4xOC192 Mode) on page 1223</a></p> <p><a href="#">show interfaces detail (IPv6 Tracking) on page 1226</a></p> <p><a href="#">show interfaces (shared interface) on page 1227</a></p> |
| <b>Output Fields</b>            | Table 61 on page 1202 lists the output fields for the <b>show interfaces</b> (SONET/SDH) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 61: SONET/SDH show interfaces Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                                                                  | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                                                                                                                                    |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                                                    | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                       | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                     | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                      | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                | All levels                   |
| <b>Clocking</b>           | SONET/SDH reference clock source: <b>Internal</b> or <b>External</b> . Clocking is configured and displayed only for channel 0.                                                                                                                                                    | All levels                   |
| <b>Framing mode</b>       | Framing mode: <b>SONET</b> or <b>SDH</b> .                                                                                                                                                                                                                                         | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                           | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                            | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                             | All levels                   |
| <b>Payload scrambler</b>  | Whether payload scrambling is enabled.                                                                                                                                                                                                                                             | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                         | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                            | All levels                   |
| <b>Shared-interface</b>   | Indicates whether the routing domain is the owner or non-owner of the shared interface. If the routing domain is the Root System Domain (RSD), the value is <b>Owner</b> . If the routing domain is a Protected System Domain (PSD) under the RSD, the value is <b>Non-owner</b> . | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                      | All levels                   |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>ANSI or ITU LMI settings</b> | <p>(Frame Relay) Settings for Local Management Interface (LMI). The format is (ANSI or ITU) LMI settings: <i>value</i>, <i>value</i>... <i>xx</i> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li>• <b>n391dte</b>—DTE full status polling interval (1-255)</li> <li>• <b>n392dce</b>—DCE error threshold (1-10)</li> <li>• <b>n392dte</b>—DTE error threshold (1-10)</li> <li>• <b>n393dce</b>—DCE monitored event count (1-10)</li> <li>• <b>n393dte</b>—DTE monitored event count (1-10)</li> <li>• <b>t391dte</b>—DTE polling timer (5-30 seconds)</li> <li>• <b>t392dce</b>—DCE polling verification timer (5-30 seconds)</li> </ul> | All levels                   |
| <b>LMI</b>                      | Input: <i>value</i> ( <i>hh:mm:ss ago</i> ), Output: <i>value</i> ( <i>hh:mm:ss ago</i> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>brief</b> none            |
| <b>LMI statistics</b>           | <p>(Frame Relay) LMI packet statistics:</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: <i>nn</i> (last seen <i>hh:mm:ss ago</i>)</b>.</li> <li>• <b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: <i>nn</i> (last sent <i>hh:mm:ss ago</i>)</b>.</li> </ul>                                                                                                                                           | <b>detail</b> extensive      |
| <b>DTE statistics</b>           | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE):</p> <ul style="list-style-type: none"> <li>• <b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li>• <b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li>• <b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li>• <b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                      | <b>detail</b> extensive none |
| <b>DCE statistics</b>           | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li>• <b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li>• <b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li>• <b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li>• <b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                             | <b>detail</b> extensive none |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output              |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>                 | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b>         | (Frame Relay. Displayed only from the DTE) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Hold-times</b>                        | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Keepalive settings</b>                | (PPP and HDLC) Configured settings for keepalives. <ul style="list-style-type: none"> <li>• <b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li>• <b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li>• <b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | All levels                   |
| <b>Keepalive or Keepalive statistics</b> | (PPP and HDLC) Information about keepalive packets. <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li>• <b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was received, in the format <b>hh:mm:ss</b>.</li> </ul> </li> <li>• <b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li>• <b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was sent, in the format <b>hh:mm:ss</b>.</li> </ul> </li> </ul>                                                                              | All levels                   |
| <b>LCP state</b>                         | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                            | <b>detail extensive none</b> |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output              |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>NCP state</b>               | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>CHAP state</b>              | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the <b>Success</b> state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Input rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | None specified               |
| <b>Output rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | Number of bytes and packets received and transmitted on the physical interface, and the traffic rate in bits per seconds (bps). <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Label-switched interface (LSI) traffic statistics</b> | (Frame Relay) LSI traffic statistics: <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes and speed, in bits per second (bps), received on the interface.</li> <li>• <b>Output packets</b>—Number of packets and speed, in bps, transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |
| <b>Input errors</b>                                      | Input errors on the interface whose definitions are as follows: <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Bucket Drops</b>—Drops resulting from the traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is <b>off</b>.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>HS link FIFO overflows</b>—Number of FIFO overflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> </ul> | <b>extensive</b> |



Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Output errors</b>                        | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>HS link FIFO underflows</b>—Number of FIFO underflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeds the MTU of the interface.</li> </ul> | <b>extensive</b>        |
| <b>IPv6 transit statistics</b>              | <p>Number of transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |
| <b>Egress queues</b>                        | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Queue counters</b>                       | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>extensive</b>        |
| <b>SONET alarms</b><br><b>SONET defects</b> | (SONET) SONET media-specific alarms and defects that prevents the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SONET PHY</b> , <b>SONET section</b> , <b>SONET line</b> , and <b>SONET path</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels              |
| <b>Link</b>                                 | (For 4-port OC192c PIC operating in OC768-over-4xOC192 mode) The link number. Errors and alarms are displayed for each link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>        |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET PHY</b>     | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b> |
| <b>SONET section</b> | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>extensive</b> |
| <b>SONET line</b>    | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET path</b>                 | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>ES-PFE</b>—Errored seconds (far-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |
| <b>Received SONET overhead</b>    | Values of the received and transmitted SONET overhead:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |
| <b>Transmitted SONET overhead</b> | <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3</b> and <b>Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| <b>SDH alarms</b>                 | SDH media-specific defects that can prevent the interface from passing packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels       |
| <b>SDH defects</b>                | When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SDH PHY</b> , <b>SDH regenerator section</b> , <b>SDH multiplex section</b> , and <b>SDH path</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH PHY</b>                 | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |
| <b>SDH regenerator section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>RS-BIP8</b>—24-bit BIP for multiplex section overhead (B2 bytes)</li> <li>• <b>OOF</b>—Out of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>RS-ES</b>—Errored seconds (near-end regenerator section)</li> <li>• <b>RS-SES</b>—Severely errored seconds (near-end regenerator section)</li> <li>• <b>RS-SEFS</b>—Severely errored framing seconds (regenerator section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| <b>SDH multiplex section</b>   | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>MS-BIP24</b>—8-bit BIP for high-order path overhead (B3 byte)</li> <li>• <b>MS-FEBE</b>—Far-end block error (multiplex section)</li> <li>• <b>MS-FERF</b>—Far-end remote fail (multiplex section)</li> <li>• <b>MS-AIS</b>—Alarm indication signal (multiplex section)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>MS-ES</b>—Errored seconds (near-end multiplex section)</li> <li>• <b>MS-SES</b>—Severely errored seconds (near-end multiplex section)</li> <li>• <b>MS-UAS</b>—Unavailable seconds (near-end multiplex section)</li> <li>• <b>MS-ES-FE</b>—Errored seconds (far-end multiplex section)</li> <li>• <b>MS-SES-FE</b>—Severely errored seconds (far-end multiplex section)</li> <li>• <b>MS-UAS-FE</b>—Unavailable seconds (far-end multiplex section)</li> </ul> | <b>extensive</b> |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                                                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH path</b>                                                     | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>HP-BIP8</b>—8-bit BIP for regenerator section overhead (B1 byte)</li> <li>• <b>HP-FEBE</b>—Far-end block error (high-order path)</li> <li>• <b>HP-LOP</b>—Loss of pointer (high-order path)</li> <li>• <b>HP-AIS</b>—High-order-path alarm indication signal</li> <li>• <b>HP-FERF</b>—Far-end remote fail (high-order path)</li> <li>• <b>HP-UNEQ</b>—Unequipped (high-order path)</li> <li>• <b>HP-PLM</b>—Payload label mismatch (high-order path)</li> <li>• <b>HP-ES</b>—Errored seconds (near-end high-order path)</li> <li>• <b>HP-SES</b>—Severely errored seconds (near-end high-order path)</li> <li>• <b>HP-UAS</b>—Unavailable seconds (near-end high-order path)</li> <li>• <b>HP-ES-FE</b>—Errored seconds (far-end high-order path)</li> <li>• <b>HP-SES-FE</b>—Severely errored seconds (far-end high-order path)</li> <li>• <b>HP-UAS-FE</b>—Unavailable seconds (far-end high-order path)</li> </ul> | <b>extensive</b> |
| <b>Received SDH overhead</b><br><br><b>Transmitted SDH overhead</b> | <p>Values of the received and transmitted SONET overhead:</p> <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1 and K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3 and Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b> |
| <b>Received path trace</b><br><br><b>Transmitted path trace</b>     | <p>SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>HDLC configuration</b>                     | Information about the HDLC configuration. <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>             |
| <b>CoS information</b>                        | Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Packet Forwarding Engine configuration</b> | Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Index</b>                                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>PPP parameters</b>                         | The PPP loopback clear timer value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>             |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Shared interface</b>       | Provides the following information: <ul style="list-style-type: none"> <li>• <b>shared with</b>—(RSD only) Indicates which PSD owns the logical shared interface. For example, <b>psd3</b>.</li> <li>• <b>peer interface</b>—(PSD only) Lists the logical tunnel interface that peers with the logical shared interface. For example, <b>ut-2/1/0.2</b>.</li> <li>• <b>tunnel token</b>—Specifies the receive (RX) and transmit (TX) tunnel tokens. For example, <b>Rx: 5.519, Tx: 13.514</b>.</li> </ul> | All levels                   |
| <b>Input packets</b>          | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                      | None specified               |
| <b>Output packets</b>         | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                   | None specified               |
| <b>Traffic statistics</b>     | Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                             | <b>detail extensive</b>      |
| <b>Local statistics</b>       | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                        | <b>detail extensive</b>      |
| <b>Transit statistics</b>     | Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Protocol</b>               | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b><i>protocol-family</i></b> | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                                                                                                                  | <b>brief</b>                 |
| <b>Multilink bundle</b>       | (If the logical interface is configured as part of a multilink bundle.) Interface name for the multilink bundle.                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>AS bundle</b>              | (If the logical interface is configured as part of an aggregated SONET bundle.) AS bundle number.                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| <b>MTU</b>                    | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Generation</b>             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| <b>Route table</b>            | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>      |
| <b>Flags</b>                  | Information about the protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on <a href="#">page 958</a> .                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |

Table 61: SONET/SDH show interfaces Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Addresses, Flags</b> | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Destination</b>      | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Local</b>            | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Broadcast</b>        | Broadcast address of the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>DLCI</b>             | (Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b> , <b>Total down time</b> , <b>Last down</b> , and <b>Traffic statistics</b> . <b>Flags</b> is one or more of the following: <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>Dce-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive</b>      |
| <b>DLCI statistics</b>  | (Frame Relay) Data-link connection identifier (DLCI) statistics. <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |

## Sample Output

### show interfaces (SDH Mode, PPP)

```

user@host> show interfaces so-0/0/0
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Interface index: 149, SNMP ifIndex: 66
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
 Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 30 (00:00:07 ago), Output: 29 (00:00:05 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
 CHAP state: Closed
 CoS queues : 4 supported, 4 maximum usable queues
 Last flapped : 2006-03-24 13:20:56 PST (00:05:09 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 SDH alarms : None
 SDH defects : None

```



```

Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
 Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3
 Protocol iso, MTU: 4470
 Flags: Protocol-Down
 Protocol mpls, MTU: 4458, Maximum labels: 3
 Flags: Protocol-Down, Is-Primary

```

### show interfaces brief (SDH Mode, PPP)

```

user@host> show interfaces so-0/0/0 brief
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
 Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 25 (00:00:01 ago), Output: 24 (00:00:04 ago)
 SDH alarms : None
 SDH defects : None

Logical interface so-0/0/0.0
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
 inet 10.0.12.1/30
 iso
 mpls

```

### show interfaces detail (SDH Mode, PPP)

```

user@host> show interfaces so-0/0/0 detail
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Interface index: 149, SNMP ifIndex: 66, Generation: 35
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
 Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 33 (last seen 00:00:05 ago)
 Output: 32 (last sent 00:00:06 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
 CHAP state: Closed
 CoS queues : 4 supported, 4 maximum usable queues
 Last flapped : 2006-03-24 13:20:56 PST (00:05:38 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 862 0 bps
 Output bytes : 3592 64 bps
 Input packets: 70 0 pps
 Output packets: 330 0 pps
 Egress queues: 4 supported, 4 in use
 Queue counters: Queued packets Transmitted packets Dropped packets

```

|                |     |     |   |
|----------------|-----|-----|---|
| 0 best-effort  | 0   | 0   | 0 |
| 1 expedited-fo | 0   | 0   | 0 |
| 2 assured-forw | 0   | 0   | 0 |
| 3 network-cont | 329 | 329 | 0 |

SDH alarms : None  
SDH defects : None

Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43) (Generation 19)

Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP

Protocol inet, MTU: 4470, Generation: 48, Route table: 0

Flags: None

Addresses, Flags: Is-Preferred Is-Primary

Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3,  
Generation: 48

Protocol iso, MTU: 4470, Generation: 49, Route table: 0

Flags: Protocol-Down

Protocol mpls, MTU: 4458, Maximum labels: 3, Generation: 50, Route table: 0

Flags: Protocol-Down, Is-Primary

#### show interfaces extensive (SDH Mode, PPP)

user@host> show interfaces so-0/0/0 extensive

Physical interface: so-0/0/0, Enabled, Physical link is Up

Interface index: 149, SNMP ifIndex: 66, Generation: 35

Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,

Loopback: None, FCS: 16, Payload scrambler: Enabled

Device flags : Present Running

Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000

Link flags : Keepalives

Hold-times : Up 0 ms, Down 0 ms

Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3

Keepalive statistics:

Input : 36 (last seen 00:00:01 ago)

Output: 35 (last sent 00:00:10 ago)

LCP state: Opened

NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:

Not-configured

CHAP state: Closed

CoS queues : 4 supported, 4 maximum usable queues

Last flapped : 2006-03-24 13:20:56 PST (00:06:08 ago)

Statistics last cleared: Never

Traffic statistics:

Input bytes : 922 0 bps

Output bytes : 3850 64 bps

Input packets: 75 0 pps

Output packets: 356 0 pps

Label-switched interface (LSI) traffic statistics:

Input bytes : 0 0 bps

Input packets: 0 0 pps

Input errors:

Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,

Bucket drops: 0, Policed discards: 218, L3 incompletes: 0,

L2 channel errors: 0, L2 mismatch timeouts: 2, HS link CRC errors: 0,

HS link FIFO overflows: 0

Output errors:

Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0,

HS link FIFO underflows: 0, MTU errors: 0

```

Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 354 354 0

SDH alarms : None
SDH defects : None
SDH PHY: Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 2 1 OK
SDH regenerator section:
 RS-BIP8 0 0
 OOF 3 8 OK
 LOS 3 2 OK
 LOF 3 2 OK
 RS-ES 3
 RS-SES 3
 RS-SEFS 3
SDH multiplex section:
 MS-BIP24 0 0
 MS-FEBE 0 0
 MS-FERF 3 2 OK
 MS-AIS 2 1 OK
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 MS-ES 3
 MS-SES 3
 MS-UAS 0
 MS-SES-FE 3
 MS-UAS-FE 0
SDH path:
 HP-BIP8 0 0
 HP-FEBE 0 0
 HP-LOP 1 1 OK
 HP-AIS 2 1 OK
 HP-FERF 3 2 OK
 HP-UNEQ 0 0 OK
 HP-PLM 1 1 OK
 HP-ES 3
 HP-SES 3
 HP-UAS 0
 HP-ES-FE 3
 HP-SES-FE 3
 HP-UAS-FE 0
Received SDH overhead:
 F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SDH overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00
Received path trace: R2 so-0/0/0
 52 32 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00 R2 so-0/0/0.....
Transmitted path trace: R1 so-0/0/0

```

```

52 31 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 R1 so-0/0/0.....
HDLC configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 4484, Runt threshold: 3
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 147744000 95 0 low none
3 network-control 5 7776000 5 0 low none

Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43) (Generation 19)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
PPP parameters:
 PPP loopback clear timer: 3 sec
Protocol inet, MTU: 4470, Generation: 48, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3,
 Generation: 48
Protocol iso, MTU: 4470, Generation: 49, Route table: 0
 Flags: Protocol-Down
Protocol mpls, MTU: 4458, Maximum labels: 3, Generation: 50, Route table: 0
 Flags: Protocol-Down, Is-Primary
MS-ES-FE 3

```

#### show interfaces brief (SONET Mode, Frame Relay)

```

user@host> show interfaces so-0/0/0 brief
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, FCS: 16, Payload scrambler: Enabled
Device flags : Present Running
Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives DTE
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 29 (00:00:02 ago), Output: 28 (00:00:01 ago)
SONET alarms : None
SONET defects : None

Logical interface so-0/0/0.0
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
 inet 10.0.12.1 --> 10.0.12.2
 iso
 mpls
 DLCI 16
 Flags: Down, DCE-Unconfigured
 Total down time: 00:04:12 sec, Last down: 00:04:12 ago

```

#### show interfaces (SONET Mode, Frame Relay)

```

user@host> show interfaces so-0/0/0
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 66
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, FCS: 16, Payload scrambler: Enabled
Device flags : Present Running
Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives DTE

```

```

ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI: Input: 23 (00:00:05 ago), Output: 22 (00:00:03 ago)
DTE statistics:
 Enquiries sent : 19
 Full enquiries sent : 3
 Enquiry responses received : 20
 Full enquiry responses received : 3
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
CoS queues : 4 supported, 4 maximum usable queues
Last flapped : 2006-03-06 11:53:20 PST (3d 03:09 ago)
Input rate : 0 bps (0 pps)
Output rate : 56 bps (0 pps)
SONET alarms : None
SONET defects : None

```

```

Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Input packets : 0
Output packets: 0
Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.0.12.2, Local: 10.0.12.1
Protocol iso, MTU: 4470
 Flags: None
Protocol mpls, MTU: 4450, Maximum labels: 3
DLCI 16
 Flags: Down, DCE-Unconfigured
 Total down time: 00:03:11 sec, Last down: 00:03:11 ago
 Input packets : 0
 Output packets: 0
DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

#### show interfaces detail (SONET Mode, Frame Relay)

```

user@host> show interfaces so-0/0/0 detail
Physical interface: so-0/0/0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 66, Generation: 11
Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, FCS: 16, Payload scrambler: Enabled
Device flags : Present Running
Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives DTE
Hold-times : Up 0 ms, Down 0 ms
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI statistics:
 Input : 33 (last seen 00:00:09 ago)
 Output: 32 (last sent 00:00:01 ago)
DTE statistics:
 Enquiries sent : 27
 Full enquiries sent : 5

```

```

 Enquiry responses received : 28
 Full enquiry responses received : 5
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
CoS queues : 4 supported, 4 maximum usable queues
Last flapped : 2006-03-06 11:53:20 PST (3d 03:10 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 495368 0 bps
 Output bytes : 2765014 56 bps
 Input packets: 41165 0 pps
 Output packets: 133530 0 pps
Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 18 18 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 133506 133506 0

SONET alarms : None
SONET defects : None
Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43) (Generation 28)
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Protocol inet, MTU: 4470, Generation: 49, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.0.12.2, Local: 10.0.12.1, Broadcast: Unspecified,
 Generation: 61
 Protocol iso, MTU: 4470, Generation: 50, Route table: 0
 Flags: None
 Protocol mpls, MTU: 4450, Maximum labels: 3, Generation: 51, Route table: 0
 DLCI 16
 Flags: Down, DCE-Unconfigured
 Total down time: 00:04:54 sec, Last down: 00:04:54 ago

```

```

Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

#### show interfaces extensive (SONET Mode, Frame Relay)

```

user@host> show interfaces so-0/0/0 extensive
Physical interface: so-0/0/0, Enabled, Physical link is Up
 Interface index: 128, SNMP ifIndex: 66, Generation: 11
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC3, Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives DTE
 Hold-times : Up 0 ms, Down 0 ms
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI statistics:
 Input : 39 (last seen 00:00:02 ago)
 Output: 36 (last sent 00:00:07 ago)
 DTE statistics:
 Enquiries sent : 30
 Full enquiries sent : 6
 Enquiry responses received : 33
 Full enquiry responses received : 6
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
 CoS queues : 4 supported, 4 maximum usable queues
 Last flapped : 2006-03-06 11:53:20 PST (3d 03:11 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 495452 56 bps
 Output bytes : 2765074 0 bps
 Input packets: 41171 0 pps
 Output packets: 133534 0 pps
 Label-switched interface (LSI) traffic statistics:
 Input bytes : 0 0 bps
 Input packets: 0 0 pps
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Bucket drops: 0, Policed discards: 0, L3 incompletes: 0,
 L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,
 HS link FIFO overflows: 0
 Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0,
 HS link FIFO underflows: 0, MTU errors: 0
 Egress queues: 4 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 18 18 0

```

```

1 expedited-fo 0 0 0

2 assured-forw 0 0 0

3 network-cont 133510 133510 0

SONET alarms : None
SONET defects : None
SONET PHY:
Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 60 1 OK
SONET section:
BIP-B1 0 0
SEF 108 158 OK
LOS 108 2 OK
LOF 108 2 OK
ES-S 108
SES-S 108
SEFS-S 108
SONET line:
BIP-B2 0 0
REI-L 0 0
RDI-L 1 1 OK
AIS-L 107 1 OK
BERR-SF 0 0 OK
BERR-SD 44 2 OK
ES-L 108
SES-L 108
UAS-L 97
ES-LFE 1
SES-LFE 1
UAS-LFE 0
SONET path:
BIP-B3 0 0
REI-P 0 0
LOP-P 1 1 OK
AIS-P 107 1 OK
RDI-P 1 1 OK
UNEQ-P 0 0 OK
PLM-P 1 1 OK
ES-P 108
SES-P 108
UAS-P 97
ES-PFE 1
SES-PFE 1
UAS-PFE 0
Received SONET overhead:
F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00
Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0xcf, F2 : 0x00, Z3 : 0x00
Z4 : 0x00
Received path trace: R2 so-0/0/0
52 32 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00 R2 so-0/0/0.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a
Transmitted path trace: R1 so-0/0/0

```



```

52 31 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00 R1 so-0/0/0.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
HDLC configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 4484, Runt threshold: 3
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 147744000 95 0 low none
3 network-control 5 7776000 5 0 low none

Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43) (Generation 28)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 4470, Generation: 49, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.0.12.2, Local: 10.0.12.1, Broadcast: Unspecified,
 Generation: 61
Protocol iso, MTU: 4470, Generation: 50, Route table: 0
 Flags: None
Protocol mpls, MTU: 4450, Maximum labels: 3, Generation: 51, Route table: 0
DLCI 16
 Flags: Down, DCE-Unconfigured
 Total down time: 00:05:42 sec, Last down: 00:05:42 ago
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

#### show interfaces extensive (OC768-over-4xOC192 Mode)

```

user@host> show interfaces so-7/0/0 extensive
Physical interface: so-7/0/0, Enabled, Physical link is Up
 Interface index: 163, SNMP ifIndex: 23, Generation: 186
 Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode, Speed:
 OC768,
 Loopback: Local, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running

```

```

Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : No-Keepalives
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2006-01-13 10:43:39 PST (01:05:33 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 76992 200 bps
 Output bytes : 83707 216 bps
 Input packets : 1343 0 pps
 Output packets: 1343 0 pps
Input errors:
 Errors: 0, Drops: 3885, Framing errors: 68154624, Runts: 0, Giants: 0, Bucket
drops: 0,
 Policed discards: 0, L3 incompletes: 95040248, L2 channel errors: 0, L2
mismatch timeouts: 0,
 HS link CRC errors: 0, HS link FIFO overflows: 30742070
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
underflows: 0,
 MTU errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 2 2 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 1341 1341 0

SONET alarms : None
SONET defects : None
Link : 0
SONET alarms : None
SONET defects : None
SONET PHY:
Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 0 0 OK
SONET section:
BIP-B1 0 0
SEF 2 1 OK
LOS 0 0 OK
LOF 3 2 OK
ES-S 2
SES-S 2
SEFS-S 2
SONET line:
BIP-B2 0 0
REI-L 0 0
RDI-L 1 1 OK
AIS-L 2 1 OK
BERR-SF 0 0 OK
BERR-SD 0 0 OK
ES-L 3
SES-L 3
UAS-L 0
ES-LFE 1
SES-LFE 1
UAS-LFE 0

```

```

SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 2 1 OK
 RDI-P 0 0 OK
 UNEQ-P 0 0 OK
 PLM-P 0 0 OK
 ES-P 3
 SES-P 3
 UAS-P 0
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Payload pointer:
 Current pointer : 522
 Pointer increment count : 0
 Pointer decrement count : 0
 New pointer NDF count : 0
Received SONEt overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONEt overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00
Received path trace: fold so-7/0/0
 66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00 fold so-7/0/0...
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a
Transmitted path trace: fold so-7/0/0
 66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00 fold so-7/0/0...
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Link : 1
SONET alarms : None
SONET defects : None
SONET PHY:
 Seconds Count State
 PLL Lock 0 0 OK
 PHY Light 0 0 OK
SONET section:
 BIP-B1 0 0
 SEF 2 1 OK
 LOS 0 0 OK
 LOF 3 2 OK
 ES-S 2
 SES-S 2
 SEFS-S 2
SONET line:
 BIP-B2 0 0
 REI-L 0 0
 RDI-L 0 0 OK
 AIS-L 2 1 OK
 BERR-SF 0 0 OK
 BERR-SD 0 0 OK
 ES-L 3
 SES-L 3
 UAS-L 0

```

```

 ES-LFE 0
 SES-LFE 0
 UAS-LFE 0
SONET path:
 BIP-B3 0 0
 REI-P 0 0
 LOP-P 0 0 OK
 AIS-P 2 1 OK
 RDI-P 0 0 OK
 UNEQ-P 0 0 OK
 PLM-P 0 0 OK
 ES-P 3
 SES-P 3
 UAS-P 0
 ES-PFE 0
 SES-PFE 0
 UAS-PFE 0
Payload pointer:
 Current pointer : 522
 Pointer increment count : 0
 Pointer decrement count : 0
 New pointer NDF count : 0
Received SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00
 Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
 F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
 S1 : 0x00, C2 : 0xcf, F2 : 0x00, Z3 : 0x00
 Z4 : 0x00
Received path trace: fold so-7/0/0
66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00 fold so-7/0/0...
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a
Transmitted path trace: fold so-7/0/0
66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00 fold so-7/0/0...
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
...

```

### show interfaces detail (IPv6 Tracking)

```

user@host> show interfaces so-0/2/0 detail
Physical interface: so-0/2/0, Enabled, Physical link is Up
 Interface index: 130, SNMP ifIndex: 26, Generation: 131
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode,
Speed: OC3,
 Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 7 (last seen 00:00:01 ago)
 Output: 6 (last sent 00:00:08 ago)
 LCP state: Opened
 NCP state: inet: Not-configured, inet6: Opened, iso: Not-configured, mpls:
Not-configured

```

```

CHAP state: Closed
PAP state: Closed
CoS queues : 4 supported, 4 maximum usable queues
Last flapped : 2007-11-29 08:45:47 PST (1d 03:44 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 7407782 40 bps
 Output bytes : 7307322 48 bps
 Input packets : 107570 0 pps
 Output packets: 108893 0 pps
IPv6 transit statistics:
 Input bytes : 57328
 Output bytes : 57400
 Input packets : 1024
 Output packets: 1025
Egress queues: 4 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets
 0 best-effort 1191 1191 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 107700 107700 0
SONET alarms : None
SONET defects : None

Logical interface so-0/2/0.0 (Index 70) (SNMP ifIndex 47) (Generation 231)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
 Protocol inet6, MTU: 4470, Generation: 433, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: abcd::a18:104/126, Local: abcd::a18:105,
 Broadcast: Unspecified, Generation: 683
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::2a0:a5ff:fe56:52a,
 Broadcast: Unspecified, Generation: 684

```

### show interfaces (shared interface)

```

user@rsd1> show interfaces so-7/2/0
Physical interface: so-7/2/0, Enabled, Physical link is Down
 Interface index: 128, SNMP ifIndex: 109
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
 Speed: OC192, Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Shared-interface : Owner
 Link flags : No-Keepalives DTE
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI: Input: 0 (never), Output: 0 (never)
 DTE statistics:
 Enquiries sent : 0
 Full enquiries sent : 0
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0

```

```

 Out-of-sequence packets received : 0
 Keepalive responses timedout : 0
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2008-08-11 10:51:51 PDT (1w1d 04:47 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 SONET alarms : LOL, PLL
 SONET defects : LOL, PLL, LOF, SEF, AIS-L, AIS-P

Logical interface so-7/2/0.0 (Index 67) (SNMP ifIndex 117)
 Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
 Shared interface:
 Shared with: psd5
 Tunnel token: Rx: 2.517, Tx: 1.517
 Input packets : 0
 Output packets: 0
 DLCI 700
 Flags: Active
 Total down time: 00:01:09 sec, Last down: 284:58:21 ago
 Input packets : 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :1 Inactive DLCI :0

```

## show interfaces (Serial)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>interface-type</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display status information about serial interfaces, including RS-232, RS-422/449, EIA-530, X.21, and V.35.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b><i>interface-type</i></b>—On M Series and T Series routers, the interface type is <b><i>se-fpc/pic/port</i></b>.</p> <p><b><i>brief   detail   extensive   terse</i></b>—(Optional) Display the specified level of output.</p> <p><b><i>descriptions</i></b>—(Optional) Display interface description strings.</p> <p><b><i>media</i></b>—(Optional) Display media-specific information about network interfaces.</p> <p><b><i>snmp-index snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b><i>statistics</i></b>—(Optional) Display static interface statistics.</p>                                                             |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (Serial, EIA-530) on page 1235</a></p> <p><a href="#">show interfaces brief (Serial, EIA-530) on page 1235</a></p> <p><a href="#">show interfaces detail (Serial, EIA-530) on page 1236</a></p> <p><a href="#">show interfaces extensive (Serial, EIA-530) on page 1236</a></p> <p><a href="#">show interfaces (Serial, V.35) on page 1237</a></p> <p><a href="#">show interfaces brief (Serial, V.35) on page 1238</a></p> <p><a href="#">show interfaces detail (Serial, V.35) on page 1238</a></p> <p><a href="#">show interfaces extensive (Serial, V.35) on page 1239</a></p> <p><a href="#">show interfaces statistics detail (RS 449) on page 1240</a></p> |
| <b>Output Fields</b>            | Table 62 on page 1229 lists the output fields for the <b>show interfaces (Serial)</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 62: show interfaces (Serial) Output Fields

| Field Name         | Field Description                                                                                                                                            | Level of Output |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Physical Interface |                                                                                                                                                              |                 |
| Physical interface | Name of the physical interface.                                                                                                                              | All levels      |
| Enabled            | State of the interface. Possible values are described in the “Enabled Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958. | All levels      |

Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Interface index</b>      | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>         | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Generation</b>           | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Type</b>                 | Type of interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Link-level type</b>      | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>MTU</b>                  | Maximum transmission unit (MTU) size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Maximum speed</b>        | Maximum speed. The nonconfigurable value is 16,384 kbps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Device flags</b>         | Information about the physical device. Possible values are described in the "Device Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Interface flags</b>      | Information about the interface. Possible values are described in the "Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Link flags</b>           | Information about the link. Possible values are described in the "Link Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels                   |
| <b>Hold-times</b>           | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Keepalive settings</b>   | (PPP and HDLC) Configured settings for keepalive packets. <ul style="list-style-type: none"> <li><b>Interval <i>seconds</i></b>—Time between successive keepalive requests. The range of values, in seconds, is 10 to 32,767. The default value is 10.</li> <li><b>Up-count <i>number</i></b>—Number of keepalive packets a destination must receive to change a link's status from down to up. The range of values is 1 to 255. The default value is 1.</li> <li><b>Down-count <i>number</i></b>—Number of keepalive packets a destination must fail to receive before the network takes a link down. The range is 1 to 255. The default value is 3.</li> </ul> | All levels                   |
| <b>Keepalive</b>            | (PPP and HDLC) Information about keepalive packets. <ul style="list-style-type: none"> <li><b>Input: <i>number (hh:mm:ss ago)</i></b>—Number of keepalive packets received by PPP and the time since the last keepalive packet was received.</li> <li><b>Output: <i>number (hh:mm:ss ago)</i></b>—Number of keepalive packets sent by PPP and the time since the last keepalive packet was sent.</li> </ul>                                                                                                                                                                                                                                                      | <b>brief none</b>            |
| <b>Keepalive statistics</b> | (PPP and HDLC) Information about keepalive packets. <ul style="list-style-type: none"> <li><b>Input: <i>number (last seen hh:mm:ss ago)</i></b>—Number of keepalive packets received by PPP and the time since the last keepalive packet was received.</li> <li><b>Output: <i>number (last seen hh:mm:ss ago)</i></b>—Number of keepalive packets sent by PPP and the time since the last keepalive packet was sent.</li> </ul>                                                                                                                                                                                                                                  | <b>detail extensive</b>      |



Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>LCP state</b>               | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>NCP state</b>               | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>CHAP state</b>              | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Closed</b>—CHAP authentication is incomplete.</li> <li>• <b>Failure</b>—CHAP authentication failed.</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Success</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Input Rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | None specified               |
| <b>Output Rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>      |

Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>          | <b>extensive</b>        |
| <b>Output errors</b>           | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeds the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |
| <b>Egress queues supported</b> | Total number of egress queues supported on the specified interface. Displayed with the <b>statistics</b> option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Egress queues in use</b>    | Total number of egress queues in use on the specified interface. Displayed with the <b>statistics</b> option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b> |

Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Queue counters                         | CoS queue number and its associated user-configured forwarding class name. Displayed with the <b>statistics</b> option. <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Serial media information               | Information about the physical media: <ul style="list-style-type: none"> <li>• <b>Line protocol</b>—<b>eia530</b>, <b>eia530a</b>, <b>rs232</b>, <b>rs449</b>, <b>v.35</b>, or <b>x.21</b>.</li> <li>• <b>Resync history</b>—Information about resynchronization events: <ul style="list-style-type: none"> <li>• <b>Sync loss count</b>—Number of times the synchronization was lost.</li> </ul> </li> <li>• <b>Data signal</b>—(X.21 and V.35) Information about the data signal: <ul style="list-style-type: none"> <li>• <b>Rx Clock</b>—Receive clock status: OK (DTE is receiving the receive clock signal) or Not detected (receive clock signal is not being received).</li> </ul> </li> <li>• <b>Control signals</b>—Information about modem control signals: <ul style="list-style-type: none"> <li>• <b>Local mode</b>:DCE (data communication equipment) or DTE (data terminal equipment)</li> <li>• <b>To DCE</b>—Control signals that the Serial PIC sent to the DCE: DTR (Data Terminal Ready:<b>up</b> or <b>down</b>) or RTS (Request To Send: <b>up</b> or <b>down</b>.)</li> <li>• <b>From DC</b>—Control signals that the Serial PIC received from the DCE: CTS (Clear To Send: <b>up</b> or <b>down</b>), DCD (Data Carrier Detect: <b>up</b> or <b>down</b>), DSR (Data Set Ready: <b>up</b> or <b>down</b>), or TM (Test Mode: <b>up</b> or <b>down</b>).</li> </ul> </li> <li>• <b>Clocking mode</b>—Clocking used for the transmit clock: <ul style="list-style-type: none"> <li>• <b>dte</b>—Transmit clock is generated by DTE.</li> <li>• <b>dce</b>—Transmit clock is generated by the DCE and is looped back as the transmit clock.</li> <li>• <b>loop-timed</b>—Receive clock from the DCE is looped back as the transmit clock.</li> </ul> </li> <li>• <b>Clock rate</b>—Rate, in megahertz (MHz), at which the clock is configured.</li> <li>• <b>Loopback</b>—Configured loopback mode for the interface: <b>dce-remote</b>, <b>dce-local</b>, <b>liu</b>, <b>local</b>, or <b>none</b>.</li> <li>• <b>Tx clock</b>—Clocking phase of the transmit clock: <b>invert</b> (transmit clock polarity is inverted) or <b>non-invert</b> (transmit clock polarity is not inverted).</li> <li>• <b>Line encoding</b>—Type of line encoding used: <b>nrz</b> (nonreturn to zero) or <b>nrzi</b> (return to zero inverted).</li> </ul> | detail extensive |
| Packet Forwarding Engine configuration | Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | extensive        |

Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>        | Information about the CoS queue for the physical interface: <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Logical interface</b>      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Index</b>                  | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>           | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Flags</b>                  | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Encapsulation</b>          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b><i>protocol-family</i></b> | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the source and destination address are also displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>brief</b>                 |
| <b>Protocol</b>               | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>MTU</b>                    | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Generation</b>             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Route Table</b>            | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Flags</b>                  | Information about protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |

Table 62: show interfaces (Serial) Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                          | Level of Output              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Addresses, Flags</b> | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> . | <b>detail extensive none</b> |
| <b>Destination</b>      | IP address of the remote side of the connection.                                                                                                                           | <b>detail extensive none</b> |
| <b>Local</b>            | IP address of the logical interface.                                                                                                                                       | <b>detail extensive none</b> |
| <b>Broadcast</b>        | Broadcast address of the logical interface.                                                                                                                                | <b>detail extensive none</b> |
| <b>Generation</b>       | Unique number for use by Juniper Networks technical support only.                                                                                                          | <b>detail extensive</b>      |

## Sample Output

### show interfaces (Serial, EIA-530)

```

user@host> show interfaces se-5/0/1
Physical interface: se-5/0/1, Enabled, Physical link is Up
 Interface index: 144, SNMP ifIndex: 41
 Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps
 Device flags : Present Running
 Interface flags: Point-To-Point Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 32 (00:00:10 ago), Output: 31 (00:00:07 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
 CHAP state: Closed
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2006-04-26 15:10:18 PDT (00:05:22 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)

 Logical interface se-5/0/1.0 (Index 71) (SNMP ifIndex 45)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
 Protocol inet, MTU: 1500
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 12.0.0.0/30, Local: 12.0.0.1, Broadcast: 12.0.0.3

```

### show interfaces brief (Serial, EIA-530)

```

user@host> show interfaces se-5/0/1 brief
Physical interface: se-5/0/1, Enabled, Physical link is Up
 Type: Serial, Link-level type: PPP, MTU: 1504
 Device flags : Present Running
 Interface flags: Point-To-Point Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 235 (00:00:10 ago), Output: 234 (00:00:00 ago)

 Logical interface se-5/0/1.0

```

```
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
inet 12.0.0.1/30
```

### show interfaces detail (Serial, EIA-530)

```
user@host> show interfaces se-5/0/1 detail
Physical interface: se-5/0/1, Enabled, Physical link is Up
 Interface index: 144, SNMP ifIndex: 41, Generation: 25
 Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps
 Device flags : Present Running
 Interface flags: Point-To-Point Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 37 (last seen 00:00:06 ago)
 Output: 35 (last sent 00:00:01 ago)
 LCP state: Opened
 NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
 Not-configured
 CHAP state: Closed
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2006-04-26 15:10:18 PDT (00:06:02 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 928 40 bps
 Output bytes : 1023 48 bps
 Input packets : 76 0 pps
 Output packets: 77 0 pps
 Serial media information:
 Line protocol: eia530
 Resync history:
 Sync loss count: 0
 Data signal:
 Rx Clock: OK
 Control signals:
 Local mode: DTE
 To DCE: DTR: up, RTS: up
 From DCE: CTS: up, DCD: up, DSR: up
 Clocking mode: loop-timed
 Clock rate: 8.0 MHz
 Loopback: none
 Tx clock: non-invert
 Line encoding: nrz

 Logical interface se-5/0/1.0 (Index 71) (SNMP ifIndex 45) (Generation 9)
 Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
 Protocol inet, MTU: 1500, Generation: 15, Route table: 0
 Flags: None
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 12.0.0.0/30, Local: 12.0.0.1, Broadcast: 12.0.0.3,
 Generation: 23
```

### show interfaces extensive (Serial, EIA-530)

```
user@host> show interfaces se-5/0/1 extensive
Physical interface: se-5/0/1, Enabled, Physical link is Up
 Interface index: 144, SNMP ifIndex: 41, Generation: 25
 Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps
 Device flags : Present Running
 Interface flags: Point-To-Point Internal: 0x4000
```

```

Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
 Input : 40 (last seen 00:00:00 ago)
 Output: 37 (last sent 00:00:09 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Closed
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2006-04-26 15:10:18 PDT (00:06:28 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 988 40 bps
 Output bytes : 1088 48 bps
 Input packets: 81 0 pps
 Output packets: 82 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 2, Runts: 0, Giants: 0,
 Policed discards: 0, Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, MTU errors: 0,
 Resource errors: 0
Serial media information:
 Line protocol: eia530
 Resync history:
 Sync loss count: 0
 Data signal:
 Rx Clock: OK
 Control signals:
 Local mode: DTE
 To DCE: DTR: up, RTS: up
 From DCE: CTS: up, DCD: up, DSR: up
 Clocking mode: loop-timed
 Clock rate: 8.0 MHz
 Loopback: none
 Tx clock: non-invert
 Line encoding: nrz
Packet Forwarding Engine configuration:
 Destination slot: 5, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
 0 best-effort 95 15564800 95 0 low none
 3 network-control 5 819200 5 0 low none

Logical interface se-5/0/1.0 (Index 71) (SNMP ifIndex 45) (Generation 9)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 15, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
 Destination: 12.0.0.0/30, Local: 12.0.0.1, Broadcast: 12.0.0.3,
 Generation: 23

```

### show interfaces (Serial, V.35)

```

user@host> show interfaces se-5/0/0
Physical interface: se-5/0/0, Enabled, Physical link is Down
Interface index: 150, SNMP ifIndex: 39
Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps

```

```
Device flags : Present Running Down
Interface flags: Hardware-Down Point-To-Point Internal: 0x4000
Link flags : Loose-NCP
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive: Input: 0 (never), Output: 0 (never)
LCP state: Down
NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured
CHAP state: Closed
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2006-04-26 14:51:27 PDT (01:02:23 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)

Logical interface se-5/0/0.0 (Index 73) (SNMP ifIndex 27)
 Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps
 Encapsulation: PPP
 Protocol inet, MTU: 1500
 Flags: Protocol-Down
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 13.0.0.0/30, Local: 13.0.0.2, Broadcast: 13.0.0.3
```

#### show interfaces brief (Serial, V.35)

```
user@host> show interfaces se-5/0/0 brief
Physical interface: se-5/0/0, Enabled, Physical link is Down
 Type: Serial, Link-level type: PPP, MTU: 1504
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point Internal: 0x4000
 Link flags : Loose-NCP
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 0 (never), Output: 0 (never)

Logical interface se-5/0/0.0
 Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps
 Encapsulation: PPP
 inet 13.0.0.2/30
```

#### show interfaces detail (Serial, V.35)

```
user@host> show interfaces se-5/0/0 detail
Physical interface: se-5/0/0, Enabled, Physical link is Down
 Interface index: 150, SNMP ifIndex: 39, Generation: 31
 Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point Internal: 0x4000
 Link flags : Loose-NCP
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 LCP state: Down
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured
 CHAP state: Closed
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2006-04-26 14:51:27 PDT (01:03:15 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
```



```

Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Serial media information:
 Line protocol: v.35
 Resync history:
 Sync loss count: 0
 Data signal:
 Rx Clock: Not Detected
 Control signals:
 Local mode: DCE
 To DTE: CTS: down, DCD: down, DSR: up
 From DTE: DTR: down, RTS: down
 DCE loopback override: Off
 Clocking mode: internal
 Clock rate: 38.4 KHz
 Loopback: none
 Tx clock: non-invert
 Line encoding: nrz

Logical interface se-5/0/0.0 (Index 73) (SNMP ifIndex 27) (Generation 12)
 Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps
 Encapsulation: PPP
 Protocol inet, MTU: 1500, Generation: 17, Route table: 0
 Flags: Protocol-Down
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 13.0.0.0/30, Local: 13.0.0.2, Broadcast: 13.0.0.3,
 Generation: 23

```

#### show interfaces extensive (Serial, V.35)

```

user@host> show interfaces se-5/0/0 extensive
Physical interface: se-5/0/0, Enabled, Physical link is Down
 Interface index: 150, SNMP ifIndex: 39, Generation: 31
 Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 16384kbps
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point Internal: 0x4000
 Link flags : Loose-NCP
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 LCP state: Down
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Closed
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2006-04-26 14:51:27 PDT (01:04:17 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Policed discards: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
 Resource errors: 0

```

```

Serial media information:
 Line protocol: v.35
 Resync history:
 Sync loss count: 0
 Data signal:
 Rx Clock: Not Detected
 Control signals:
 Local mode: DCE
 To DTE: CTS: down, DCD: down, DSR: up
 From DTE: DTR: down, RTS: down
 DCE loopback override: Off
 Clocking mode: internal
 Clock rate: 38.4 KHz
 Loopback: none
 Tx clock: non-invert
 Line encoding: nrz
Packet Forwarding Engine configuration:
 Destination slot: 5, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
 0 best-effort 95 15564800 95 0 low none
 3 network-control 5 819200 5 0 low none

Logical interface se-5/0/0.0 (Index 73) (SNMP ifIndex 27) (Generation 12)
Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps
Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 17, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 13.0.0.0/30, Local: 13.0.0.2, Broadcast: 13.0.0.3,
 Generation: 23

```

#### show interfaces statistics detail (RS 449)

```

user@host> show interfaces se-6/0/0 statistics detail
Interface index: 149, SNMP ifIndex: 59, Generation: 150
Type: Serial, Link-level type: PPP, MTU: 1504, Maximum speed: 8mbps
Device flags : Present Running
Interface flags: Point-To-Point Internal: 0x4000
Link flags : No-Keepalives Loose-NCP
Hold-times : Up 0 ms, Down 0 ms
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Closed
PAP state: Closed
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2007-11-28 19:38:36 PST (00:14:06 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 744 0 bps
 Output bytes : 5978 0 bps
 Input packets: 33 0 pps
 Output packets: 129 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0,
 Resource errors: 0
Output errors:
 Carrier transitions: 13, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:

```

0

Egress queues: 8 supported, 5 in use

| Queue counters: | Queued packets | Transmitted packets | Dropped packets |
|-----------------|----------------|---------------------|-----------------|
| 0 best-effort   | 24             | 24                  | 0               |
| 1 expedited-fo  | 0              | 0                   | 0               |
| 2 bulk          | 0              | 0                   | 0               |
| 3 assured-forw  | 105            | 105                 | 0               |
| 4 voip          | 0              | 0                   | 0               |

Serial media information:

Line protocol: rs449

Resync history:

Sync loss count: 0

Data signal:

Rx Clock: OK

Control signals:

Local mode: DTE

To DCE: DTR: up, RTS: up

From DCE: CTS: up, DCD: up, DSR: up

Clocking mode: internal

Loopback: none

Tx clock: non-invert

Line encoding: nrz

Logical interface se-6/0/0.0 (Index 75) (SNMP ifIndex 69) (Generation 141)

Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP

Protocol inet, MTU: 256, Generation: 145, Route table: 0

Flags: None

Addresses, Flags: Is-Preferred Is-Primary

Destination: 11.11.11/24, Local: 11.11.11.2, Broadcast: 11.11.11.255,

Generation: 157

## show interfaces (T1, E1, or DS)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces <i>interface-type</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;descriptions&gt;</code><br><code>&lt;media&gt;</code><br><code>&lt;snmp-index <i>snmp-index</i>&gt;</code><br><code>&lt;statistics&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Display status information about the specified T1, E1, or DS interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b><i>interface-type</i></b>—On ACX Series, M Series, MX Series, and T Series routers, the T1 interface type is <b><i>t1-fpc/pic/port</i></b>, whereas the E1 interface type is <b><i>e1-fpc/pic/port</i></b>, and DS interface type is <b><i>ds-fpc/pic/port:&lt;channel&gt;</i></b>.</p> <p><b><i>brief   detail   extensive   terse</i></b>—(Optional) Display the specified level of output.</p> <p><b><i>descriptions</i></b>—(Optional) Display interface description strings.</p> <p><b><i>media</i></b>—(Optional) Display media-specific information about network interfaces.</p> <p><b><i>snmp-index snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b><i>statistics</i></b>—(Optional) Display static interface statistics.</p>                                 |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Interfaces on ACX Series Universal Access Routers</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (T1, IMA Link) on page 1254</a></p> <p><a href="#">show interfaces (T1, PPP) on page 1255</a></p> <p><a href="#">show interfaces detail (T1, PPP) on page 1255</a></p> <p><a href="#">show interfaces extensive (T1 CRC Errors) on page 1256</a></p> <p><a href="#">show interfaces extensive (T1, PPP) on page 1256</a></p> <p><a href="#">show interfaces (E1, Frame Relay) on page 1258</a></p> <p><a href="#">show interfaces detail (E1, Frame Relay) on page 1259</a></p> <p><a href="#">show interfaces extensive (E1, Frame Relay) on page 1260</a></p> <p><a href="#">show interfaces (E1, IMA Link) on page 1262</a></p> <p><a href="#">show interfaces extensive (T1, TDM-CCC-SATOP) on page 1263</a></p> <p><a href="#">show interfaces extensive (DS, TDM-CCC-CESoPSN) on page 1264</a></p> |
| <b>Output Fields</b>            | <p><a href="#">Table 63 on page 1243</a> lists the output fields for the <b>show interfaces</b> (T1 or E1) command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 63: T1 or E1 show interfaces Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                                                                             | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                                                                                                                                               |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                                                               | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                   | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                 | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                           | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                           | All levels                   |
| <b>Clocking</b>           | Reference clock source: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                  | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                      | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                       | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                        | All levels                   |
| <b>Framing</b>            | Physical layer framing format used for the E1 interface on the link: <b>G704</b> , <b>G704-NO-CRC4</b> , or <b>Unframed</b> . The default is <b>G704</b> .<br><br>Physical layer framing format used for the T1 interface on the link: <b>SF</b> and <b>ESF</b> . The default is <b>ESF</b> . | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                     | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                        | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                  | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                           | <b>detail extensive</b>      |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>IMA Link alarms</b>  | Current active IMA link alarms, including the following: <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• RFI-IMA</li> <li>• Tx-Mis-Connected</li> <li>• Tx-Unusable-FE</li> <li>• Rx-Unusable-FE</li> <li>• Link Fault</li> </ul>                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>IMA Link defects</b> | Current active IMA link defects, including the following: <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• RFI-IMA</li> <li>• Tx-Mis-Connected</li> <li>• Tx-Unusable-FE</li> <li>• Rx-Unusable-FE</li> <li>• Link Fault</li> </ul>                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>IMA Link state</b>   | Current active IMA link status, including the following: <ul style="list-style-type: none"> <li>• <b>Line:</b> synchronized or not synchronized</li> <li>• <b>Near end:</b>—Status of near-end receive and transmit links <ul style="list-style-type: none"> <li>• <b>Rx:</b> Usable or Unusable</li> <li>• <b>Tx:</b> Usable or Unusable</li> </ul> </li> <li>• <b>Far end:</b>—Status of far-end receive and transmit links <ul style="list-style-type: none"> <li>• <b>Rx:</b> Usable or Unusable</li> <li>• <b>Tx:</b> Usable or Unusable</li> </ul> </li> </ul> | <b>detail extensive none</b> |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output       |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IMA link media       | <p>IMA Link Media Status, which provides the seconds and count state for the following link media parameters:</p> <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• Err-ICP</li> <li>• IV</li> <li>• Rx-FC</li> <li>• Tx-FC</li> <li>• FE-Defects</li> <li>• FE-Rx-FC</li> <li>• FE-Tx-FC</li> <li>• Rx-ICP</li> <li>• Rx-Stuff</li> <li>• Tx-ICP</li> <li>• Tx-Stuff</li> <li>• Rx-SES</li> <li>• Rx-UAS</li> <li>• Rx-UUS</li> <li>• Tx-UUS</li> <li>• FE-Rx-SES</li> <li>• FE-Rx-UAS</li> <li>• FE-Rx-UUS</li> <li>• FE-Tx-UUS</li> </ul>                                                                                                                                                                                                                                       | detail extensive none |
| Keepalive settings   | <p>(PPP and HDLC) Configured settings for keepalives.</p> <ul style="list-style-type: none"> <li>• <b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is 10 seconds through 32,767 seconds, with a default of 10 seconds.</li> <li>• <b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is 1 through 255, with a default of 3.</li> <li>• <b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is 1 through 255, with a default of 1.</li> </ul>                                                                                                                                    | detail extensive none |
| Keepalive statistics | <p>(PPP and HDLC) Information about keepalive packets. (When no level of output is specified, the word <b>statistics</b> is not part of the field name and the <b>last seen</b> text is not displayed.)</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li>• <b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li>• <b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li>• <b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul> | detail extensive none |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>LMI settings</b>   | <p>(Frame Relay) Settings for Local Management Interface (LMI) which can be either ANSI LMI settings or ITU LMI settings. ANSI LMI settings is the default. The format is <b>(ANSI or ITU) LMI settings: value, value... xx</b> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li>• <b>n391dte</b>—DTE full status polling interval (1–255)</li> <li>• <b>n392dce</b>—DCE error threshold (1–10)</li> <li>• <b>n392dte</b>—DTE error threshold (1–10)</li> <li>• <b>n393dce</b>—DCE monitored event count (1–10)</li> <li>• <b>n393dte</b>—DTE monitored event count (1–10)</li> <li>• <b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li>• <b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | <b>detail extensive</b> none |
| <b>LMI</b>            | <p>(Frame Relay) Local Management Interface (LMI) packet statistics:</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li>• <b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                                                        | <b>detail extensive</b> none |
| <b>DTE statistics</b> | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communications equipment (DCE):</p> <ul style="list-style-type: none"> <li>• <b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li>• <b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li>• <b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li>• <b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                                                                                         | <b>detail extensive</b> none |
| <b>DCE statistics</b> | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li>• <b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li>• <b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li>• <b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li>• <b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                                                                                           | <b>detail extensive</b> none |



Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no Local Management Interface (LMI) packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                                             | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay. Displayed only from the DTE.) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>LCP state</b>                 | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>NCP state</b>                 | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>CHAP state</b>                | (PPP) State of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response is not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Down</b>—CHAP authentication is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Opened</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS Queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Input rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | None specified               |
| <b>Output rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC or PIM. If the value of this field increments, the PIC or PIM is malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output              |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                    | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Queue counters</b>                   | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>DS1 alarms</b><br><b>DS1 defects</b> | <p>E1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see <i>Bellcore Telcordia GR-499-CORE</i>.</p> <ul style="list-style-type: none"> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| T1 media or E1 media | <p>Counts of T1 or E1 media-specific errors.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.<br/>The T1 or E1 media-specific error types are:</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>BEE</b>—Bit error</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>CRC Major</b>—Cyclic redundancy check major alarm threshold exceeded</li> <li>• <b>CRC Minor</b>—Cyclic redundancy check minor alarm threshold exceeded</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>CRC</b>—Cyclic redundancy check</li> <li>• <b>FEBE</b>—Far-end block error (E1 only)</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>BES</b>—Bursty errored seconds</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | extensive       |
| SAToP Configuration  | <p>Information about the SAToP configuration.</p> <ul style="list-style-type: none"> <li>• <b>payload-size</b>—Configure the payload size, in bytes (from 32 through 1024 bytes).</li> <li>• <b>idle-pattern</b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255).</li> <li>• <b>jitter-buffer-packets</b>—Number of packets in the jitter buffer (from 1 through 64 packets).</li> <li>• <b>jitter-buffer-latency</b>—Time delay in the jitter buffer (from 1 through 1000 milliseconds).</li> <li>• <b>excessive-packet-loss-rate</b>—Set packet loss options. The options are <b>groups</b>, <b>sample-period</b>, and <b>threshold</b>.</li> <li>• <b>sample-period</b>—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds).</li> <li>• <b>threshold</b>—Percentile designating the threshold of excessive packet loss rate (1–100 percent).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | extensive       |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output       |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| CESoPSN Configuration                  | <p>Information about the CESoPSN configuration.</p> <ul style="list-style-type: none"> <li><b>packetization-latency</b>—Time required to create packets (from 1000 through 8000 microseconds).</li> <li><b>idle-pattern</b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255).</li> <li><b>jitter-buffer-packets</b>—Number of packets in the jitter buffer (from 1 through 64 packets).</li> <li><b>jitter-buffer-latency</b>—Time delay in the jitter buffer (from 1 through 1000 milliseconds).</li> <li><b>excessive-packet-loss-rate</b>—Set packet loss options. The options are <b>sample-period</b> and <b>threshold</b>.</li> <li><b>sample-period</b>—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds).</li> <li><b>threshold</b>—Percentile designating the threshold of excessive packet loss rate (1–100 percent).</li> </ul>                                                                                                                                                                  | extensive             |
| HDLC configuration                     | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li><b>Policing bucket</b>—Configured state of the receiving policer.</li> <li><b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li><b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li><b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li><b>Timeslots</b>—Time slots configured on the interface.</li> <li><b>Buildout</b>—(T1 only) Buildout setting: 0-132, 133-265, 266-398, 399-531, or 532-655 feet.</li> <li><b>Timeslots</b>—Configured time slots for the interface.</li> <li><b>Byte encoding</b>—(T1 only) Byte encoding used: <b>Nx64K</b> or <b>Nx56K</b>.</li> <li><b>Line encoding</b>—Line encoding used. For T1, the value can be <b>B8ZS</b> or <b>AMI</b>. For E1, the value is <b>HDB3</b>.</li> <li><b>Data inversion</b>—HDLC data inversion setting: <b>Enabled</b> or <b>Disabled</b>.</li> <li><b>Idle cycle flag</b>—Idle cycle flags.</li> <li><b>Start end flag</b>—Start and end flag.</li> </ul> | extensive             |
| DS1 BERT configuration                 | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li><b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li><b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li><b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li><b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive none |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li><b>Destination slot</b>—FPC slot number.</li> <li><b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | extensive             |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>    | Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Logical interface</b>  | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Index</b>              | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the interface. Possible values are described in the "Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Encapsulation</b>      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Input packets</b>      | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | None specified               |
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | None specified               |
| <b>Traffic statistics</b> | (Frame Relay) Number and rate of bytes and packets received and transmitted on the logical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Local statistics</b>   | (Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b> | (Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter normally stabilizes in less than 1 second.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>Protocol</b>           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mlfr</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Multilink bundle</b>   | Interface name for the multilink bundle, if configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>   | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Destination</b>        | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Local</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Broadcast</b>          | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>DLCI</b>               | <p>(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b>, <b>Total down time</b>, <b>Last down</b>, and <b>Traffic statistics</b> or (<b>Input packets</b>, <b>Output packets</b>). <b>Flags</b> can be one or more of the following:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>DCE-Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>DCE-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b>    | <p>(Frame Relay) Data-link connection identifier (DLCI) statistics.</p> <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |

Table 63: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CE Info    | <p>Information related to the circuit emulation statistics.</p> <ul style="list-style-type: none"> <li>• <b>CE Tx</b>—Number of transmitted packets and bytes (TDM to PSN flow).</li> <li>• <b>CE Rx</b>—Number of received packets and bytes and forward bytes (PSN to TDM flow).</li> <li>• <b>CE Rx Forwarded</b>—Number of forwarded bytes.</li> <li>• <b>CE Strayed</b>—Number of stray packets.</li> <li>• <b>CE Lost</b>—Number of lost packets.</li> <li>• <b>CE Malformed</b>—Number of malformed packets</li> <li>• <b>CE Misinserted</b>—Number of misinserted packets.</li> <li>• <b>CE AIS dropped</b>—Number of dropped bytes due to buffer overrun (PSN to TDM).</li> <li>• <b>CE Dropped</b>—Number of dropped packets during resynchronization</li> <li>• <b>CE Overrun Events</b>—Number of overrun events.</li> <li>• <b>CE Underrun Events</b>—Number of underrun events.</li> </ul> | extensive       |

## Sample Output

### show interfaces (T1, IMA Link)

```

user@host> show interfaces t1-1/0/0
IMA Link alarms : None
IMA Link defects : LIF, LODS
IMA Link state:
 Line : Not synchronized
 Near end : Rx: Unusable, Tx: Usable
 Far end : Rx: Unusable, Tx: Usable
IMA link media: Seconds Count State
LIF 0 0 OK
LODS 0 0 OK
Err-ICP 0 0 OK
IV 0 0 OK
Rx-FC 0 0 OK
Tx-FC 0 0 OK
FE-Defects 0 0
FE-Rx-FC 0 0
FE-Tx-FC 0 0
Rx-ICP 0 0
Rx-Stuff 0 0
Tx-ICP 0 11
Tx-Stuff 0 0
Rx-SES 0
Rx-UAS 0
Rx-UUS 1
Tx-UUS 0
FE-Rx-SES 0
FE-Rx-UAS 0
FE-Rx-UUS 0
FE-Tx-UUS 0

```



**show interfaces (T1, PPP)**

```

user@host> show interfaces t1-1/1/0
Physical interface: t1-1/1/0, Enabled, Physical link is Up
 Interface index: 149, SNMP ifIndex: 45
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
 Loopback: None, FCS: 16, Framing: ESF
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 0 (never), Output: 0 (never)
 LCP state: Opened
 NCP state: Opened
 CHAP state: Opened
 CoS queues : 4 supported, 4 in use
 Last flapped : 2005-12-05 08:43:06 PST (02:13:35 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 72 bps (0 pps)
 DS1 alarms : None
 DS1 defects : None

Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51)
 Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
 Protocol inet, MTU: 1500
 Flags: Protocol-Down
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255

```

**show interfaces detail (T1, PPP)**

```

user@host> show interfaces t1-1/1/0 detail
Physical interface: t1-1/1/0, Enabled, Physical link is Up
 Interface index: 149, SNMP ifIndex: 45, Generation: 32
 Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
 Loopback: None, FCS: 16, Framing: ESF
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 LCP state: Opened
 NCP state: Opened
 CHAP state: Opened
 CoS queues : 4 supported, 4 in use
 Last flapped : 2005-12-05 08:43:06 PST (02:13:52 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 798 0 bps
 Input packets : 0 0 pps
 Output packets: 42 0 pps
 Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0

```

```

2 assured-forw 0 0 0
3 network-cont 40 40 0

DS1 alarms : None
DS1 defects : None
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1
Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 14, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
Generation: 18

```

### show interfaces extensive (T1 CRC Errors)

```

user@host> show interfaces t1-3/2/0:1:1 extensive
Physical interface: t1-3/2/0:1:1, Enabled, Physical link is Down
Interface index: 179, SNMP ifIndex: 79, Generation: 180
:
:
DS1 alarms : AIS, LOF, CRC Major, CRC Minor
DS1 defects : AIS, LOF, CRC Major, CRC Minor
T1 media: Seconds Count State
SEF 1 1 OK
BEE 1 1 OK
AIS 1128 1 Defect Active
LOF 1128 1 Defect Active
LOS 0 0 OK
YELLOW 0 0 OK
CRC Major 154 1 Defect Active
CRC Minor 154 1 Defect Active
BPV 0 0
EXZ 0 0
LCV 0 0
PCV 0 0
CS 0 0
CRC 154 15400
...

```

### show interfaces extensive (T1, PPP)

```

user@host> show interfaces t1-1/1/0 extensive
Physical interface: t1-1/1/0, Enabled, Physical link is Up
Interface index: 149, SNMP ifIndex: 45, Generation: 32
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
LCP state: Down
NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured

```

```

CHAP state: Closed
CoS queues : 4 supported, 4 in use
Last flapped : 2005-12-05 08:43:06 PST (02:13:54 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 817 72 bps
 Input packets : 0 0 pps
 Output packets: 43 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

 Resource errors: 0
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 42 42 0

DS1 alarms : None
DS1 defects : None
T1 media:
 Seconds Count State
SEF 1 1 OK
BEE 0 0 OK
AIS 0 0 OK
LOF 1 1 OK
LOS 0 0 OK
YELLOW 1 1 OK
BPV 1 1
EXZ 1 1
LCV 1 65535
PCV 1 1023
CS 0 0
LES 1
ES 1
SES 1
SEFS 1
BES 0
UAS 0

HDLC configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 1514, Runt threshold: 3
 Timeslots : All active
 Line encoding: B8ZS
 Buildout : 0 to 132 feet
 Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
 Start end flag: shared
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1
Packet Forwarding Engine configuration:
 Destination slot: 1, PLP byte: 1 (0x00)

```

```

CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
 0 best-effort 95 1459200 95 0 low none
 3 network-control 5 76800 5 0 low none

```

```

Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 14, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
Generation: 18

```

### show interfaces (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0
Physical interface: e1-3/0/0, Enabled, Physical link is Up
 Interface index: 146, SNMP ifIndex: 37
 Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
 Loopback: None, FCS: 16, Framing: G704
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives DTE
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI: Input: 0 (never), Output: 11 (00:00:05 ago)
 DTE statistics:
 Enquiries sent : 10
 Full enquiries sent : 1
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timeout : 1
 CoS queues : 8 supported
 Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 DS1 alarms : None
 DS1 defects : None
 Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32)
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
 Input packets : 0
 Output packets: 0
 Protocol inet, MTU: 1500
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255
 DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:01:13 sec, Last down: 00:01:13 ago
 Input packets : 0
 Output packets: 0

```

```

DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

### show interfaces detail (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0 detail
Physical interface: e1-3/0/0, Enabled, Physical link is Up
 Interface index: 146, SNMP ifIndex: 37, Generation: 69
 Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
 Loopback: None, FCS: 16, Framing: G704
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives DTE
 Hold-times : Up 0 ms, Down 0 ms
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI statistics:
 Input : 0 (last seen: never)
 Output: 12 (last sent 00:00:02 ago)
 DTE statistics:
 Enquiries sent : 10
 Full enquiries sent : 2
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
 CoS queues : 8 supported
 Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 225 56 bps
 Input packets: 0 0 pps
 Output packets: 15 0 pps
 Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 limited      | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 real-plus    | 0              | 0                   | 0               |
| 3 network-cont | 15             | 15                  | 0               |

```

 DS1 alarms : None
 DS1 defects : None
 DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
 Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0

```

```

 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 1500, Generation: 32, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
 Generation: 42
DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:01:18 sec, Last down: 00:01:18 ago
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

#### show interfaces extensive (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0 extensive
Physical interface: e1-3/0/0, Enabled, Physical link is Up
 Interface index: 146, SNMP ifIndex: 37, Generation: 69
 Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
 Loopback: None, FCS: 16, Framing: G704
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives DTE
 Hold-times : Up 0 ms, Down 0 ms
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI statistics:
 Input : 0 (last seen: never)
 Output: 12 (last sent 00:00:05 ago)
 DTE statistics:
 Enquiries sent : 10
 Full enquiries sent : 2
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timeout : 1
 CoS queues : 8 supported
 Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
 Statistics last cleared: Never

```

```

Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 225 0 bps
Input packets: 0 0 pps
Output packets: 15 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 17, Errors: 0, Drops: 0, Aged packets: 0,
MTU errors: 0, Resource errors: 0
Queue counters: Queued packets Transmitted packets Dropped packets

0 limited 0 0 0

1 expedited-fo 0 0 0

2 real-plus 0 0 0

3 network-cont 15 15 0

DS1 alarms : None
DS1 defects : None
E1 media: Seconds Count State
SEF 0 0 OK
BEE 5 5 OK
AIS 0 0 OK
LOF 245 15 OK
LOS 245 4 OK
YELLOW 0 11 OK
BPV 0 0
EXZ 9 9
LCV 0 0
PCV 0 0
CS 0 0
FEBE 0 0
LES 0
ES 0
SES 0
SEFS 0
BES 0
UAS 271

HDLC configuration:
Policing bucket: Disabled
Shaping bucket : Disabled
Giant threshold: 1506, Runt threshold: 0
Timeslots : All active
Line encoding: HDB3, Data inversion: Disabled, Idle cycle flag: flags,
Start end flag: shared
DS1 BERT configuration:
BERT time period: 10 seconds, Elapsed: 0 seconds
Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
Destination slot: 3, PLP byte: 1 (0x00)
CoS information:
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 limited 95 1945600 95 0 low none
3 network-control 5 102400 5 0 low none
Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)

```

```

Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 1500, Generation: 32, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
 Generation: 42
 DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:01:21 sec, Last down: 00:01:21 ago
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

### show interfaces (E1, IMA Link)

```

user@host> show interfaces e1-1/0/0
IMA Link alarms : None
IMA Link defects : LIF, LODS
IMA Link state:
 Line : Not synchronized
 Near end : Rx: Unusable, Tx: Usable
 Far end : Rx: Unusable, Tx: Usable
IMA link media: Seconds Count State
LIF 0 0
LODS 0 0
Err-ICP 0 0
IV 0 0
Rx-FC 0 0
Tx-FC 0 0
FE-Defects 0 0
FE-Rx-FC 0 0
FE-Tx-FC 0 0
Rx-ICP 0 0
Rx-Stuff 0 0
Tx-ICP 11 0
Tx-Stuff 0 0
Rx-SES 0
Rx-UAS 0
Rx-UUS 1
Tx-UUS 0
FE-Rx-SES 0
FE-Rx-UAS 0

```



```
FE-Rx-UUS 0
FE-Tx-UUS 0
```

### show interfaces extensive (T1, TDM-CCC-SATOP)

```
user@host>show interfaces t1-1/0/0:1:1 extensive
Physical interface: t1-1/0/0:1:1, Enabled, Physical link is Down
 Interface index: 153, SNMP ifIndex: 579, Generation: 817
 Link-level type: TDM-CCC-SATOP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF,
 Parent: coc1-1/0/0:1 Interface index 152
 Device flags : Present Running Down
 Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
 Link flags : None
 Hold-times : Up 0 ms, Down 0 ms
 CoS queues : 8 supported, 8 maximum usable queues
 Last flapped : 2012-10-28 02:12:40 PDT (22:32:13 ago)
 Statistics last cleared: 2012-10-29 00:44:52 PDT (00:00:01 ago)
 Egress queues: 8 supported, 4 in use
 Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
DS1 alarms : None
DS1 defects : None
T1 media: Seconds Count State
 SEF 0 0 OK
 BEE 0 0 OK
 AIS 0 0 OK
 LOF 0 0 OK
 LOS 0 0 OK
 YELLOW 0 0 OK
 CRC Major 0 0 OK
 CRC Minor 0 0 OK
 BPV 0 0
 EXZ 0 0
 LCV 0 0
 PCV 0 0
 CS 0 0
 CRC 0 0
 LES 0
 ES 0
 SES 0
 SEFS 0
 BES 0
 UAS 0

SAToP configuration:
 Payload size: 192
 Idle pattern: 0xFF
 Octet aligned: Disabled
```

```

 Jitter buffer: packets: 8, latency: 7 ms, auto adjust: Disabled
 Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
DS1 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
SONET alarms : None
SONET defects : AIS-V, RDI-V
SONET vt:
 BIP-BIP2 0 0
 REI-V 0 0
 LOP-V 0 0 OK
 AIS-V 2 0 Defect Active
 RDI-V 2 0 Defect Active
 UNEQ-V 0 0 OK
 PLM-V 0 0 OK
 ES-V 0
 SES-V 0
 UAS-V 2
 ES-VFE 0
 SES-VFE 0
 UAS-VFE 0
Received SONET overhead:
V5 : 0x07
V5(cmp) : 0x02
Transmitted SONET overhead:
V5 : 0x02
Packet Forwarding Engine configuration:
 Destination slot: 1
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort 95 1459200 95 0 low
none
 3 network-control 5 76800 5 0 low
none

Logical interface t1-1/0/0:1:1.0 (Index 69) (SNMP ifIndex 580) (Generation 525)

 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-SATOP
CE info Packets Bytes Count
CE Tx 1005 192960
CE Rx 1004 192768
CE Rx Forwarded 0
CE Strayed 0
CE Lost 0
CE Malformed 0
CE Misinserted 0
CE AIS dropped 0
CE Dropped 1005 192960
CE Overrun Events 0
CE Underrun Events 0
 Protocol ccc, MTU: 1504, Generation: 814, Route table: 0
 Flags: Is-Primary

```

#### show interfaces extensive (DS, TDM-CCC-CESoPSN)

```

user@host>show interfaces ds-1/0/0:1:1 extensive
Physical interface: ds-1/0/0:1:1:1, Enabled, Physical link is Down
Interface index: 154, SNMP ifIndex: 597, Generation: 819

```

```

Link-level type: TDM-CCC-CESoPSN, MTU: 1504, Speed: 1536kbps, Loopback: None,
FCS: 16, Parent: ct1-1/0/0:1:1 Interface index 153
Device flags : Present Running Down
Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2012-10-29 00:49:03 PDT (00:00:35 ago)
Statistics last cleared: Never
Egress queues: 8 supported, 4 in use
Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 0              | 0                   | 0               |

```

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control
CESoPSN configuration:
 Packetization latency: 1000 us
 Idle pattern: 0xFF
 Jitter buffer: packets: 8, latency: 8 ms, auto adjust: Disabled
 Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
DSO BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Induced Error rate: 0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
 Destination slot: 1
CoS information:
 Direction : Output
 CoS transmit queue
Limit

```

|                   |    | Bandwidth | Buffer | Priority |
|-------------------|----|-----------|--------|----------|
|                   | %  | bps       | usec   |          |
| 0 best-effort     | 95 | 1459200   | 0      | low      |
| 3 network-control | 5  | 76800     | 0      | low      |

```

Logical interface ds-1/0/0:1:1:1.0 (Index 69) (SNMP ifIndex 598) (Generation 549)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-CESoPSN
CE info

```

|                    | Packets | Bytes   | Count |
|--------------------|---------|---------|-------|
| CE Tx              | 0       | 0       |       |
| CE Rx              | 35712   | 6856704 |       |
| CE Rx Forwarded    |         | 0       |       |
| CE Strayed         | 0       |         |       |
| CE Lost            | 0       |         |       |
| CE Malformed       | 0       |         |       |
| CE Misinserted     | 0       |         |       |
| CE AIS dropped     | 0       |         |       |
| CE Dropped         | 0       | 0       |       |
| CE Overrun Events  |         | 0       |       |
| CE Underrun Events |         | 1       |       |

Protocol ccc, MTU: 1504, Generation: 857, Route table: 0  
Flags: Is-Primary

## show interfaces (T3 or E3)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>interface-type</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Display status information about the specified T3 or E3 interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b><i>interface-type</i></b>—On M Series and T Series routers, the T3 interface type is <b>t3-fpc/pic/port</b>, whereas the E3 interface type is <b>e3-fpc/pic/port</b>.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (T3, PPP) on page 1276</a></p> <p><a href="#">show interfaces detail (T3, PPP) on page 1277</a></p> <p><a href="#">show interfaces extensive (T3, PPP) on page 1278</a></p> <p><a href="#">show interfaces (E3, Frame Relay) on page 1279</a></p> <p><a href="#">show interfaces detail (E3, Frame Relay) on page 1280</a></p> <p><a href="#">show interfaces extensive (E3, Frame Relay) on page 1281</a></p>                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | Table 64 on page 1267 lists the output fields for the <b>show interfaces</b> (T3 or E3) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Table 64: T3 or E3 show interfaces Output Fields**

| Field Name                | Field Description                                                                                                                                           | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Physical Interface        |                                                                                                                                                             |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                             | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> . | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                              | <b>detail extensive</b> none |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Clocking</b>           | Reference clock source. It can be <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels                   |
| <b>Mode</b>               | (T3 only) Whether C-bit parity mode or M13 mode is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Long buildout</b>      | (T3 only) Buildout setting: less than 255 feet (68 meters) or greater than 255 feet and shorter than 450 feet (137 meters).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Framing</b>            | (E3 only) Physical layer framing format used on the link. It can be <b>G751</b> or <b>Unframed</b> . The default is <b>G751</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| <b>Keepalive settings</b> | (PPP and HDLC) Configured settings for keepalives. <ul style="list-style-type: none"> <li><b>interval seconds</b>—Time in seconds between successive keepalive requests. The range is <b>10</b> seconds through <b>32,767</b> seconds, with a default of <b>10</b> seconds.</li> <li><b>down-count number</b>—Number of keepalive packets a destination must fail to receive before the network takes a link down. The range is <b>1</b> through <b>255</b>, with a default of <b>3</b>.</li> <li><b>up-count number</b>—Number of keepalive packets a destination must receive to change a link’s status from down to up. The range is <b>1</b> through <b>255</b>, with a default of <b>1</b>.</li> </ul> | <b>detail extensive none</b> |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output       |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Keepalive statistics or Keepalive | <p>(PPP and HDLC) Information about keepalive packets.</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li><b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li><b>(last seen 00:00:00 ago)</b>—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul>                            | detail extensive none |
| LMI settings                      | <p>(Frame Relay) Local Management Interface (LMI) settings (ANSI or ITU). ANSI LMI settings is the default. The format is <b>LMI settings: value, value... xx seconds</b>, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li><b>n391dte</b>—DTE full status polling interval (1–255)</li> <li><b>n392dce</b>—DCE error threshold (1–10)</li> <li><b>n392dte</b>—DTE error threshold (1–10)</li> <li><b>n393dce</b>—DCE monitored event count (1–10)</li> <li><b>n393dte</b>—DTE monitored event count (1–10)</li> <li><b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li><b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | detail extensive none |
| LMI                               | <p>(Frame Relay) LMI statistics:</p> <ul style="list-style-type: none"> <li><b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li><b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                    | detail extensive none |
| DTE statistics                    | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communications equipment (DCE):</p> <ul style="list-style-type: none"> <li><b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li><b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li><b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li><b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                     | detail extensive none |
| DCE statistics                    | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li><b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li><b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li><b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li><b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                       | detail extensive none |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output              |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no LMI packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                                                                | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay. Displayed only from the DTE.) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>LCP state</b>                 | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>NCP state</b>                 | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>CHAP state</b>                | (PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Resp-received</b>—Response received for the challenge sent, but CHAP not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response sent for the challenge received.</li> <li>• <b>Chap-Chal-sent</b>—Challenge sent.</li> <li>• <b>Chap-Chal-received</b>—Challenge received but response not yet sent.</li> <li>• <b>Down</b>—CHAP authentication is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Opened</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (year-month-day hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>CoS queues</b>                | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |



Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output         |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Input rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | None specified          |
| <b>Output rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | None specified          |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets received on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—(T3 only) Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—(T3 only) Number of frames received that are larger than the giant threshold.</li> <li>• <b>Bucket Drops</b>—Drops resulting from the traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is <b>off</b>.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC or PIM. If the value of this field increments, the PIC or PIM is malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                          | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Queue counters</b>                         | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Active alarms</b><br><b>Active defects</b> | <p>E3 media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface.</p> <ul style="list-style-type: none"> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>FERF</b>—Far-end receive failures</li> <li>• <b>IDLE</b>—Idle code detected</li> <li>• <b>LCD</b>—Loss of cell delineation</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>PLL</b>—Phase-locked loop</li> <li>• <b>YLW</b>—Remote defect indication</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| DS3 media or E3 media | <p>Counts of DS3 (T3) or E3 media-specific errors.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than OK indicates a problem.</li> </ul> <p>The DS3 or E3 media-specific error types can be:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop out of lock</li> <li>• <b>Reframing</b>—Frame alignment recovery time</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>IDLE</b>—Idle code detected</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—(DS3 only) Pulse code violation</li> <li>• <b>CCV</b>—(DS3 only) C-bit coding violation</li> <li>• <b>FEBE</b>—(DS3 only) Far-end block error</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>PES</b>—(DS3 only) P-bit errored seconds</li> <li>• <b>PSSES</b>—(DS3 only) P-bit errored seconds (section)</li> <li>• <b>CES</b>—(DS3 only) C-bit errored seconds</li> <li>• <b>CSES</b>—(DS3 only) C-bit severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | extensive       |
| HDLC configuration    | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Idle cycle flag</b>—Idle cycle flags.</li> <li>• <b>Start end flag</b>—Start and end flag.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | extensive       |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output       |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| DSU configuration                      | <p>Information about the DSU configuration. The last three lines (<b>Bit count</b>, <b>Error bit count</b>, and <b>LOS information</b>) are displayed only if a BERT has ever been run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>Compatibility mod</b>—CSU/DSU compatibility mode: <b>None</b>, <b>Larscom</b>, <b>Kentrox</b>, or <b>Digital-Link</b>.</li> <li>• <b>Scrambling</b>—Payload scrambling: <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Subrate</b>—Configured subrate setting. Applies only when <b>Digital-Link</b> compatibility mode is used. The subrate can be <b>Disabled</b> or display units in Kbps.</li> <li>• <b>FEAC loopbac</b>—(T3) Whether a far-end alarm and control (FEAC) loopback is <b>Active</b> or <b>Inactive</b>. This feature is used to send alarm or status information from the far-end terminal back to the near-end terminal and to initiate T3 loopbacks at the far-end terminal from the near-end terminal.</li> <li>• <b>Response</b>—Whether the FEAC signal is <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Count</b>—Number of FEAC loopbacks.</li> </ul> | extensive             |
| DS3 (or E3) BERT configuration         | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive none |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | extensive             |
| CoS information                        | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul>                                                | extensive             |

---

Logical Interface

---

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Logical interface</b>  | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Index</b>              | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>             |
| <b>Flags</b>              | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Encapsulation</b>      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Input packets</b>      | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                      | None specified               |
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                   | None specified               |
| <b>Traffic statistics</b> | <p>(Frame Relay) Number and rate of bytes and packets received and transmitted on the logical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b>      |
| <b>Local statistics</b>   | (Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                          | <b>detail extensive</b>      |
| <b>Transit statistics</b> | (Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter normally stabilizes in less than 1 second.                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>Protocol</b>           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mlfr</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Multilink bundle</b>   | (Multilink) Interface name for the multilink bundle.                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |

Table 64: T3 or E3 show interfaces Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output              |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Addresses, Flags</b> | Information about the address flags. Possible values are described in the “Addresses Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Destination</b>      | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Local</b>            | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Broadcast</b>        | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Generation</b>       | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>DLCI</b>             | <p>(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b>, <b>Total down time</b>, <b>Last down</b>, and <b>Traffic statistics</b> (or <b>Input packets</b>, <b>Output packets</b>). <b>Flags</b> is one or more of the following:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>DCE Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>DCE-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b>  | <p>(Frame Relay) Data-link connection identifier (DLCI) statistics.</p> <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |

## Sample Output

### show interfaces (T3, PPP)

```

user@host> show interfaces t3-0/2/0
Physical interface: t3-0/2/0, Enabled, Physical link is Up
 Interface index: 139, SNMP ifIndex: 35
 Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
 Loopback: None, FCS: 16, Mode: C/Bit parity,
 Long buildout: Shorter than 255 feet
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 0 (never), Output: 0 (never)
 LCP state: Down
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Closed
 CoS queues : 4 supported, 4 in use
 Last flapped : 2005-12-05 08:43:06 PST (02:18:40 ago)
 Input rate : 0 bps (0 pps)

```

```

Output rate : 72 bps (0 pps)
Active alarms : None
Active defects : None
DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced error rate: 10e-0

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54)
 Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
 Protocol inet, MTU: 4470
 Flags: Protocol-Down
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255

```

### show interfaces detail (T3, PPP)

```

user@host> show interfaces t3-0/2/0 detail
Physical interface: t3-0/2/0, Enabled, Physical link is Up
 Interface index: 139, SNMP ifIndex: 35, Generation: 22
 Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
 Loopback: None, FCS: 16, Mode: C/Bit parity,
 Long buildout: Shorter than 255 feet
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 LCP state: Down
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Closed
 CoS queues : 4 supported, 4 in use
 Last flapped : 2005-12-05 08:43:06 PST (02:18:45 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 152 0 bps
 Input packets: 0 0 pps
 Output packets: 8 0 pps
 Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 6 6 0

 Active alarms : None
 Active defects : None
 DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced error rate: 10e-0

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54) (Generation 8)
 Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
 Protocol inet, MTU: 4470, Generation: 17, Route table: 0

```

```

Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
Generation: 24

```

### show interfaces extensive (T3, PPP)

```

user@host> show interfaces t3-0/2/0 extensive
Physical interface: t3-0/2/0, Enabled, Physical link is Up
 Interface index: 139, SNMP ifIndex: 35, Generation: 22
 Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
 Loopback: None, FCS: 16, Mode: C/Bit parity,
 Long buildout: Shorter than 255 feet
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives
 Hold-times : Up 0 ms, Down 0 ms
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive statistics:
 Input : 0 (last seen: never)
 Output: 0 (last sent: never)
 LCP state: Down
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Closed
 CoS queues : 4 supported, 4 in use
 Last flapped : 2005-12-05 08:43:06 PST (02:18:47 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 171 72 bps
 Input packets: 0 0 pps
 Output packets: 9 0 pps
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
 Bucket drops: 0, Policed discards: 0, L3 incompletes: 0,
 L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,
 SRAM errors: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

 Resource errors: 0
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 7 7 0

 Active alarms : None
 Active defects : None
 DS3 media:
 Seconds Count State
 PLL Lock 0 0 OK
 Reframing 0 0 OK
 AIS 0 0 OK
 LOF 0 0 OK
 LOS 0 0 OK
 IDLE 0 0 OK

```



```

YELLOW 0 0 OK
BPV 0 0
EXZ 0 0
LCV 1 4
PCV 0 0
CCV 0 0
FEBE 1 11
LES 1
PES 0
PSES 0
CES 0
CSES 0
SEFS 0
UAS 0
HDLC configuration:
 Policing bucket: Disabled
 Shaping bucket : Disabled
 Giant threshold: 4484, Runt threshold: 3
 Idle cycle flag: flags, Start end flag: shared
DSU configuration:
 Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
 FEAC loopback: Inactive, Response: Disabled, Count: 0
DS3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced error rate: 10e-0
Packet Forwarding Engine configuration:
 Destination slot: 0, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 42499200 95 0 low none
3 network-control 5 2236800 5 0 low none

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54) (Generation 8)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 4470, Generation: 17, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
 Generation: 24

```

### show interfaces (E3, Frame Relay)

```

user@host> show interfaces e3-1/2/0
Physical interface: e3-1/2/0, Enabled, Physical link is Up
 Interface index: 153, SNMP ifIndex: 49
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
 Loopback: None, FCS: 16, Framing: G751
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives DTE
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI: Input: 0 (never), Output: 4 (00:00:06 ago)
 DTE statistics:
 Enquiries sent : 4
 Full enquiries sent : 0
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0

```

```

 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
CoS queues : 4 supported, 4 in use
Last flapped : 2005-12-05 08:46:14 PST (02:27:17 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
Active alarms : None
Active defects : None

Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57)
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Input packets : 0
Output packets: 0
 Protocol inet, MTU: 4470
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
 DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:00:06 sec, Last down: 00:00:06 ago
 Input packets : 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

#### show interfaces detail (E3, Frame Relay)

```

user@host> show interfaces e3-1/2/0 detail
Physical interface: e3-1/2/0, Enabled, Physical link is Up
 Interface index: 153, SNMP ifIndex: 49, Generation: 36
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
 Loopback: None, FCS: 16, Framing: G751
 Device flags : Present Running
 Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
 Link flags : Keepalives DTE
 Hold-times : Up 0 ms, Down 0 ms
 ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
 LMI statistics:
 Input : 0 (last seen: never)
 Output: 5 (last sent 00:00:07 ago)
 DTE statistics:
 Enquiries sent : 5
 Full enquiries sent : 0
 Enquiry responses received : 0
 Full enquiry responses received : 0
 DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
 Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
 CoS queues : 4 supported, 4 in use

```

```

Last flapped : 2005-12-05 08:46:14 PST (02:27:27 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 806 0 bps
 Input packets : 0 0 pps
 Output packets: 44 0 pps
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 43 43 0

Active alarms : None
Active defects : None

Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57) (Generation 15)
 Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 Protocol inet, MTU: 4470, Generation: 24, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
 Generation: 38
 DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:00:16 sec, Last down: 00:00:16 ago
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

### show interfaces extensive (E3, Frame Relay)

```

user@host> show interfaces e3-1/2/0 extensive
Physical interface: e3-1/2/0, Enabled, Physical link is Up
 Interface index: 153, SNMP ifIndex: 49, Generation: 36
 Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
 Loopback: None, FCS: 16, Framing: G751
 Device flags : Present Running

```

```

Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
Link flags : Keepalives DTE
Hold-times : Up 0 ms, Down 0 ms
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI statistics:
 Input : 0 (last seen: never)
 Output: 6 (last sent 00:00:02 ago)
DTE statistics:
 Enquiries sent : 5
 Full enquiries sent : 1
 Enquiry responses received : 0
 Full enquiry responses received : 0
DCE statistics:
 Enquiries received : 0
 Full enquiries received : 0
 Enquiry responses sent : 0
 Full enquiry responses sent : 0
Common statistics:
 Unknown messages received : 0
 Asynchronous updates received : 0
 Out-of-sequence packets received : 0
 Keepalive responses timedout : 1
CoS queues : 4 supported, 4 in use
Last flapped : 2005-12-05 08:46:14 PST (02:27:30 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 821 56 bps
 Input packets: 0 0 pps
 Output packets: 45 0 pps
Input errors:
 Errors: 0, Drops: 0, Framing errors: 21118, Bucket drops: 0,
 Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM errors: 0,
 Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
 Resource errors: 0
Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 44 44 0

Active alarms : None
Active defects : None
E3 media:
 Seconds Count State
 PLL Lock 0 0 OK
 Reframing 187 1 OK
 AIS 0 0 OK
 LOF 187 1 OK
 LOS 187 1 OK
 IDLE 0 0 OK
 YELLOW 0 0 OK
 BPV 0 0
 EXZ 0 0

```

```

LCV 188 12303167
LES 188
SEFS 187
UAS 195
DSU configuration:
 Compatibility mode: None, Scrambling: Disabled
E3 BERT configuration:
 BERT time period: 10 seconds, Elapsed: 0 seconds
 Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced Error rate: 10e-0
Packet Forwarding Engine configuration:
 Destination slot: 1, PLP byte: 1 (0x00)
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 32649600 95 0 low none
3 network-control 5 1718400 5 0 low none

Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57) (Generation 15)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 4470, Generation: 24, Route table: 0
 Flags: None
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
 Generation: 38
 DLCI 100
 Flags: Down, DCE-Unconfigured
 Total down time: 00:00:19 sec, Last down: 00:00:19 ago
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 DLCI statistics:
 Active DLCI :0 Inactive DLCI :1

```

## show interfaces demux0 (Demux Interfaces)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces demux0.logical-interface-number &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index snmp-index&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | (MX Series and M Series routers only) Display status information about the specified demux interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about the specified demux interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index snmp-index</b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces demux0 (Demux) on page 1290</a></p> <p><a href="#">show interfaces demux0 (PPPoE over Aggregated Ethernet) on page 1291</a></p> <p><a href="#">show interfaces demux0 extensive (Targeted Distribution for Aggregated Ethernet Links) on page 1292</a></p> <p><a href="#">show interfaces demux0 (ACI Interface Set Configured) on page 1292</a></p>                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 65 on page 1284 lists the output fields for the <b>show interfaces demux0 (Demux Interfaces)</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                     |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields

| Field Name         | Field Description               | Level of Output                        |
|--------------------|---------------------------------|----------------------------------------|
| Physical Interface |                                 |                                        |
| Physical interface | Name of the physical interface. | <b>brief detail extensive<br/>none</b> |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                         | Level of Output             |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Interface index   | Index number of the physical interface, which reflects its initialization sequence.                                                                                       | brief detail extensive none |
| Enabled           | State of the interface. Possible values are described in the “Enabled Field” section under <a href="#">“Common Output Fields Description” on page 958</a> .               | brief detail extensive none |
| Physical link     | Status of the physical link ( <b>Up</b> or <b>Down</b> ).                                                                                                                 | detail extensive none       |
| Admin             | Administrative state of the interface ( <b>Up</b> or <b>Down</b> ).                                                                                                       | terse                       |
| Interface index   | Index number of the physical interface, which reflects its initialization sequence.                                                                                       | detail extensive none       |
| Link              | Status of the physical link ( <b>Up</b> or <b>Down</b> ).                                                                                                                 | terse                       |
| Targeting summary | Status of aggregated Ethernet links that are configured with targeted distribution ( <b>primary</b> or <b>backup</b> )                                                    | extensive                   |
| Bandwidth         | Bandwidth allocated to the aggregated Ethernet links that are configured with targeted distribution.                                                                      | extensive                   |
| Proto             | Protocol family configured on the interface.                                                                                                                              | terse                       |
| SNMP ifIndex      | SNMP index number for the physical interface.                                                                                                                             | detail extensive none       |
| Generation        | Unique number for use by Juniper Networks technical support only.                                                                                                         | detail extensive            |
| Type              | Type of interface. <b>Software-Pseudo</b> indicates a standard software interface with no associated hardware device.                                                     | brief detail extensive none |
| Link-level type   | Encapsulation being used on the physical interface.                                                                                                                       | brief detail extensive      |
| MTU               | Maximum transmission unit size on the physical interface.                                                                                                                 | brief detail extensive      |
| Clocking          | Reference clock source: <b>Internal</b> (1) or <b>External</b> (2).                                                                                                       | brief detail extensive      |
| Speed             | Speed at which the interface is running.                                                                                                                                  | brief detail extensive      |
| Device flags      | Information about the physical device. Possible values are described in the “Device Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> . | brief detail extensive none |
| Interface flags   | Information about the interface. Possible values are described in the “Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .    | brief detail extensive none |
| Link type         | Data transmission type.                                                                                                                                                   | detail extensive none       |
| Link flags        | Information about the link. Possible values are described in the “Link Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .              | detail extensive none       |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output       |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Physical info           | Information about the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive      |
| Hold-times              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive      |
| Current address         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive      |
| Hardware address        | Hardware MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive      |
| Alternate link address  | Backup address of the link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | detail extensive      |
| Last flapped            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | detail extensive none |
| Statistics last cleared | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive      |
| Traffic statistics      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> <li>• <b>IPv6 transit statistics</b>—Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</li> </ul> <p><b>NOTE:</b> These fields include dropped traffic and exception traffic, as those fields are not separately defined.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | detail extensive      |



Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Input errors</b>      | Input errors on the interface whose definitions are as follows: <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant packet threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>                                                                 | <b>extensive</b>                   |
| <b>Input Rate</b>        | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>none</b>                        |
| <b>Output errors</b>     | Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>                   |
| <b>Output Rate</b>       | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>none</b>                        |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    |
| <b>Logical interface</b> | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief detail extensive none</b> |
| <b>Index</b>             | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b>       |
| <b>SNMP ifIndex</b>      | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b>       |
| <b>Generation</b>        | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>                      |
| <b>Flags</b>             | Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <a href="#">"Common Output Fields Description" on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>brief detail extensive none</b> |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output                    |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Encapsulation</b>             | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>brief extensive none</b>        |
| <b>ACI VLAN: Dynamic Profile</b> | Name of the dynamic profile that defines the agent circuit identifier (ACI) interface set. If configured, the ACI interface set enables the underlying demux interface to create dynamic VLAN subscriber interfaces based on ACI information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>brief detail extensive none</b> |
| <b>Demux</b>                     | Specific IP demultiplexing (demux) values: <ul style="list-style-type: none"> <li>• <b>Underlying interface</b>—The underlying interface that the demux interface uses.</li> <li>• <b>Index</b>—Index number of the logical interface.</li> <li>• <b>Family</b>—Protocol family configured on the logical interface.</li> <li>• <b>Source prefixes, total</b>—Total number of source prefixes for the underlying interface.</li> <li>• <b>Destination prefixes, total</b>—Total number of destination prefixes for the underlying interface.</li> <li>• <b>Prefix</b>—inet family prefix.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b>       |
| <b><i>protocol-family</i></b>    | Protocol family configured on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief</b>                       |
| <b>Traffic statistics</b>        | Number and rate of bytes and packets received and transmitted on the specified interface set. <ul style="list-style-type: none"> <li>• <b>Input bytes, Output bytes</b>—Number of bytes received and transmitted on the interface set.</li> <li>• <b>Input packets, Output packets</b>—Number of packets received and transmitted on the interface set.</li> <li>• <b>IPv6 transit statistics</b>—Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.</li> </ul> <p><b>NOTE:</b> The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b>            |
| <b>Local statistics</b>          | Number of transit bytes and packets received and transmitted on the local interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b>            |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output                            |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Transit statistics</b>      | <p>Number and rate of bytes and packets transiting the switch.</p> <p><b>NOTE:</b> The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                        | <b>detail extensive</b>                    |
| <b>IPv6 Transit statistics</b> | <p>Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.</p> <p><b>NOTE:</b> The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b>                    |
| <b>Input packets</b>           | Number of packets received on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | none                                       |
| <b>Output packets</b>          | Number of packets transmitted on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | none                                       |
| <b>Protocol</b>                | Protocol family. Possible values are described in the “Protocol Field” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> none               |
| <b>MTU</b>                     | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> none               |
| <b>Maximum labels</b>          | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> none               |
| <b>Generation</b>              | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>                    |
| <b>Route table</b>             | Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>                    |
| <b>Flags</b>                   | Information about protocol family flags. Possible values are described in the “Family Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> none               |
| <b>Mac-Validate Failures</b>   | Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> none               |
| <b>Addresses, Flags</b>        | Information about the address flags. Possible values are described in the “Addresses Flags” section under “ <a href="#">Common Output Fields Description</a> ” on page 958.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> none               |
| <b>Destination</b>             | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b><br>statistics none |

Table 65: show interfaces demux0 (Demux Interfaces) Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                    | Level of Output                       |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Local</b>                | IP address of the logical interface.                                                                                                                                                                                                                                                                 | <b>detail extensive terse</b><br>none |
| <b>Remote</b>               | IP address of the remote interface.                                                                                                                                                                                                                                                                  | <b>terse</b>                          |
| <b>Broadcast</b>            | Broadcast address of the logical interlace.                                                                                                                                                                                                                                                          | <b>detail extensive</b> none          |
| <b>Generation</b>           | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                    | <b>detail extensive</b>               |
| <b>Link</b>                 | Name of the physical interfaces for member links in an aggregated Ethernet bundle for a PPPoE over aggregated Ethernet configuration. PPPoE traffic goes out on these interfaces.                                                                                                                    | <b>detail extensive</b> none          |
| <b>Dynamic-profile</b>      | Name of the PPPoE dynamic profile assigned to the underlying interface.                                                                                                                                                                                                                              | <b>detail extensive</b> none          |
| <b>Service Name Table</b>   | Name of the PPPoE service name table assigned to the PPPoE underlying interface.                                                                                                                                                                                                                     | <b>detail extensive</b> none          |
| <b>Max Sessions</b>         | Maximum number of dynamic PPPoE logical interfaces that the router can activate on the underlying interface.                                                                                                                                                                                         | <b>detail extensive</b> none          |
| <b>Duplicate Protection</b> | State of duplicate protection: <b>On</b> or <b>Off</b> . Duplicate protection prevents the activation of another dynamic PPPoE logical interface on the same underlying interface when a dynamic PPPoE logical interface for a client with the same MAC address is already active on that interface. | <b>detail extensive</b> none          |
| <b>Direct Connect</b>       | State of the configuration to ignore DSL Forum VSAs: <b>On</b> or <b>Off</b> . When configured, the router ignores any of these VSAs received from a directly connected CPE device on the interface.                                                                                                 | <b>detail extensive</b> none          |
| <b>AC Name</b>              | Name of the access concentrator.                                                                                                                                                                                                                                                                     | <b>detail extensive</b> none          |

## Sample Output

### show interfaces demux0 (Demux)

```

user@host> show interfaces demux0
Physical interface: demux0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 79, Generation: 129
Type: Software-Pseudo, Link-level type: Unspecified, MTU: 9192, Clocking: 1,
Speed: Unspecified
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link type : Full-Duplex
Link flags : None
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: Unspecified, Hardware address: Unspecified
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never

```

```

Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0

Logical interface demux0.0 (Index 87) (SNMP ifIndex 84) (Generation 312)
Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
Demux:
Underlying interface: ge-2/0/1.0 (Index 74)
Family Inet Source prefixes, total 1
Prefix: 1.1.1/24
Traffic statistics:
Input bytes : 0
Output bytes : 1554
Input packets: 0
Output packets: 37
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Local statistics:
Input bytes : 0
Output bytes : 1554
Input packets: 0
Output packets: 37
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Protocol inet, MTU: 1500, Generation: 395, Route table: 0
Flags: Is-Primary, Mac-Validate-Strict
Mac-Validate Failures: Packets: 0, Bytes: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 11.1.1/24, Local: 11.1.1.1, Broadcast: 11.1.1.255,
Generation: 434

```

#### show interfaces demux0 (PPPoE over Aggregated Ethernet)

```

user@host> show interfaces demux0.100
Logical interface demux0.100 (Index 76) (SNMP ifIndex 61160)
Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.100]
Encapsulation: ENET2

```

```
Demux:
 Underlying interface: ae0 (Index 199)
Link:
 ge-1/0/0
 ge-1/1/0
Input packets : 0
Output packets: 0
Protocol pppoe
 Dynamic Profile: pppoe-profile,
 Service Name Table: service-table1,
 Max Sessions: 100, Duplicate Protection: On,
 Direct Connect: Off,
 AC Name: pppoe-server-1
```

### show interfaces demux0 extensive (Targeted Distribution for Aggregated Ethernet Links)

```
user@host> show interfaces demux0.1073741824 extensive
```

```
Logical interface demux0.1073741824 (Index 75) (SNMP ifIndex 558) (Generation 346)
Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.1] Encapsulation: ENET2
Demux:
 Underlying interface: ae0 (Index 201)
Link:
 ge-1/0/0
 ge-1/1/0
 ge-2/0/7
 ge-2/0/8
Targeting summary:
 ge-1/1/0, primary, Physical link is Up
 ge-2/0/8, backup, Physical link is Up
Bandwidth: 1000mbps
```

### show interfaces demux0 (ACI Interface Set Configured)

```
user@host> show interfaces demux0.1073741827
Logical interface demux0.1073741827 (Index 346) (SNMP ifIndex 527)
Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.1802 0x8100.302] Encapsulation: ENET2
Demux: Source Family Inet
ACI VLAN:
 Dynamic Profile: aci-vlan-set-profile
Demux:
 Underlying interface: ge-1/0/0 (Index 138)
Input packets : 18
Output packets: 16
Protocol inet, MTU: 1500
 Flags: Sendbcst-pkt-to-re, Unnumbered
 Donor interface: lo0.0 (Index 322)
 Preferred source address: 100.20.200.202
 Addresses, Flags: Primary Is-Default Is-Primary
 Local: 10.4.12.119
Protocol pppoe
 Dynamic Profile: aci-vlan-pppoe-profile,
 Service Name Table: None,
 Max Sessions: 32000, Max Sessions VSA Ignore: Off,
 Duplicate Protection: On, Short Cycle Protection: Off,
 Direct Connect: Off,
 AC Name: nbc
```

## show interfaces extensive

---

**Syntax**    show interfaces extensive

**Release Information**    Command introduced before Junos OS Release 7.4.  
Command introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.

**Description**    Display extensive information about all interfaces configured on the router.



---

**NOTE:**

- At some times, the cumulative byte counters displayed with the `show interfaces extensive` command on the 10-Gigabit Ethernet MPC with SFP+ is not always increasing and cumulative and does not give the correct results. There is a time lag in collecting these statistics, during which the display might decrease or go from a nonzero number to zero. Eventually, the counter will display the correct result.
  - When the `show interfaces extensive` command is executed on a router with an MPC or a T4000 Type 5 FPC, the Input packet rejects counter of the Filter statistics field also displays statistics related to the following packet errors:
    - Invalid VLAN range
    - Tagged packet received on an untagged interface
  - When the `show interfaces extensive` command is executed on an interface that is configured on a T4000 Type 5 FPC, the IPv6 transit statistics field displays:
    - Total statistics (sum of transit and local statistics) at the physical interface level
    - Transit statistics at the logical interface level
  - When the `show interfaces extensive` command is executed on an aggregate interface in a T1600 Core Router, the IPv6 Input bytes is displayed for an aggregate interface. However, the IPv6 Input bytes is always zero on a member link of an aggregated bundle even when there is IPv6 transit traffic on the member link. This is because the logical interface index of the aggregate logical interface is updated but not the logical interface of the member links in the channel lookup table.
  - The Output packets field under the Traffic statistics section in the output of the `show interfaces extensive` command includes both IPv4 and IPv6 packets. For example, in a scenario in which both IPv4 and IPv6 packets are being mirrored on the same interface and when you deactivate an IPv4 port-mirroring instance on the chassis, the output of the `show interfaces extensive` command shows a value in the Output packets field of the Traffic statistics section, which is the value of IPv6 packets that are mirrored and not of the IPv4 packets. This behavior is expected.
  - For IQ2 PIC interfaces, the output of the `show interfaces extensive` command displays byte statistics that includes Layer 2 headers.
- 

**Options** This command has no options.

**Required Privilege Level** view



- List of Sample Output**
- [show interfaces extensive \(Circuit Emulation\) on page 1295](#)
  - [show interfaces extensive \(Fast Ethernet\) on page 1296](#)
  - [show interfaces extensive \(Gigabit Ethernet\) on page 1298](#)
  - [show interfaces extensive \(10-Gigabit Ethernet\) on page 1298](#)
  - [show interfaces extensive \(IQ2 and IQ2E\) on page 1300](#)
  - [show interfaces extensive \(100-Gigabit Ethernet Type 4 PIC with CFP\) on page 1303](#)
  - [show interfaces extensive \(PTX5000 Packet Transport Router\) on page 1305](#)
  - [show interfaces extensive \(MX Series Routers\) on page 1307](#)
  - [show interfaces extensive \(MX480 Router with MPC5E and 10-Gigabit Ethernet OTN Interface\) on page 1309](#)
  - [show interfaces extensive \(MX480 Router with MPC5E and 100-Gigabit Ethernet OTN Interface\) on page 1310](#)
  - [show interfaces extensive \(\(MX960 Router with MPC3E and 100-Gigabit DWDM OTN MIC\) on page 1313](#)
  - [show interfaces extensive \(PTX3000 Router with 5-port 100-Gigabit DWDM OTN PIC\) on page 1316](#)
  - [show interfaces extensive \(MX2020 Router with MPC6E and OTN MIC\) on page 1318](#)
  - [show interfaces extensive \(MX2010 Router with MPC6E and 100-Gigabit Ethernet OTN Interface\) on page 1321](#)
  - [show interfaces extensive \(MX2010 Router with MPC6E and 10-Gigabit Ethernet Interface\) on page 1323](#)
  - [show interfaces extensive \(T4000 Routers with Type 5 FPCs\) on page 1324](#)
  - [show interfaces extensive \(Aggregated Ethernet\) on page 1326](#)

**Output Fields** For more information, see the output fields table for the particular interface type in which you are interested. For information about destination class and source class statistics, see the “Destination Class Field” section and the “Source Class Field” section under [“Common Output Fields Description” on page 958](#). For sample output for specific interfaces, see the other topics in this collection.

## Sample Output

### show interfaces extensive (Circuit Emulation)

If a Circuit Emulation (CE) PIC is configured for SAToP pseudowire, then pseudowire statistics are displayed in the CE information section of the **show interface extensive** output. If SAToP pseudowire is not configured on the CE PIC, then all CE information counters display 0 (zero).

```

user@host> show interface t1-0/0/0 extensive
Physical interface :t1-0/0/0, Enabled, Physical Link : Up
 Interface index:61441
 Speed : 1.54 Mbps, Loopback: Disabled
 Operational state : Enabled, Encapsulation : Trans
 Encoding : b8zs, Framing : unframe, Build-out : 0-30
 Inversion : enable, Clock source : master
 Description :
 Traffic statistics:
 T1 media: Seconds
 ES 1643
 SES 1643

 CE Info Packets Bytes

```

```

CE Rx : 2395529 306627712
CE Tx : 2396259 306721152
CE Rx Drop: 0 0
CE Tx Drop: 0 0

CE Overrun Events: 0
CE Underrun Events: 0

```

## Sample Output

### show interfaces extensive (Fast Ethernet)

```

user@host> show interfaces fe-0/2/1 extensive
Physical interface: fe-0/2/0, Enabled, Physical link is Up
 Interface index: 129, SNMP ifIndex: 23, Generation: 130
 Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 CoS queues : 4 supported, 4 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:90:69:91:c4:3e, Hardware address: 00:90:69:91:c4:3e
 Last flapped : 2006-04-16 23:00:41 PDT (02:08:05 ago)
 Statistics last cleared: 2006-04-16 21:42:00 PDT (03:26:46 ago)
 Traffic statistics:
 Input bytes : 17539 152 bps
 Output bytes : 92968 224 bps
 Input packets : 348 0 pps
 Output packets: 1349 0 pps
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
 FIFO errors: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
 Egress queues: 4 supported, 4 in use
 Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 66             | 66                  | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 1283           | 1283                | 0               |

```

 Active alarms : None
 Active defects: None
 MAC statistics:

```

|                    | Receive | Transmit |
|--------------------|---------|----------|
| Total octets       | 24721   | 105982   |
| Total packets      | 348     | 1349     |
| Unicast packets    | 347     | 430      |
| Broadcast packets  | 1       | 37       |
| Multicast packets  | 0       | 882      |
| CRC/Align errors   | 0       | 0        |
| FIFO errors        | 0       | 0        |
| MAC control frames | 0       | 0        |
| MAC pause frames   | 0       | 0        |
| Oversized frames   | 0       | 0        |

```

Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Filter statistics:
 Input packet count 348
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 1349
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 3, CAM source filters: 0
Autonegotiation information:
 Negotiation status: Complete
 Link partner:
 Link mode: Full-duplex, Flow control: None, Remote fault: OK
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 CoS transmit queue Bandwidth Buffer Priority Limit

 % bps % usec
0 best-effort 95 95000000 95 0 low none
3 network-control 5 5000000 5 0 low none
Logical interface fe-0/2/0.0 (Index 66) (SNMP ifIndex 46) (Generation 133)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 142, Route table: 0
Flags: DCU, SCU-out

 Packets Bytes
Destination class (packet-per-second) (bits-per-second)
 silv1_new 0 0
 (0) (0)
 silv2_new 0 0
 (0) (0)
 silv_misc 0 0
 (0) (0)
 silver0 0 0
 (0) (0)
 silver2 0 0
 (0) (0)
 silver3 0 0
 (0) (0)
 silver4 0 0
 (0) (0)
 silver5 0 0
 (0) (0)
 silver6 0 0
 (0) (0)
 silver7 0 0
 (0) (0)
 silver9 0 0
 (0) (0)

 Packets Bytes
Source class (packet-per-second) (bits-per-second)
 gold1 0 0
 (0) (0)
 gold2 16600 1062400
 (0) (0)
 gold3 0 0
 (0) (0)

```

Addresses, Flags: Is-Preferred Is-Primary  
 Destination: 12.1.1/24, Local: 12.1.1.1, Broadcast: 12.1.1.255,  
 Generation: 150

### show interfaces extensive (Gigabit Ethernet)

user@host> show interfaces ge-5/0/0.0 extensive

Logical interface ge-5/0/0.0 (Index 71) (SNMP ifIndex 1930) (Generation 139)  
 Flags: SNMP-Traps 0x4000 Encapsulation: ENET2  
 Traffic statistics:  
   Input bytes : 0  
   Output bytes : 42  
   Input packets: 0  
   Output packets: 1  
 Local statistics:  
   Input bytes : 0  
   Output bytes : 42  
   Input packets: 0  
   Output packets: 1  
 Transit statistics:  
   Input bytes : 0 0 bps  
   Output bytes : 0 0 bps  
   Input packets: 0 0 pps  
   Output packets: 0 0 pps  
 Output Filters: f-any  
 Protocol inet, MTU: 1500, Generation: 155, Route table: 0  
   Output Filters: f-inet,  
   Addresses, Flags: Is-Preferred Is-Primary  
     Destination: 10.11.1/24, Local: 10.11.1.1, Broadcast: 10.11.1.255,  
     Generation: 170  
 Protocol multiservice, MTU: Unlimited, Generation: 156, Route table: 0  
 Flags: Is-Primary  
 Policer: Input: \_\_default\_arp\_policer\_\_

### show interfaces extensive (10-Gigabit Ethernet)

user@host> show interfaces xe-2/1/0 extensive

Physical interface: xe-2/1/0, Enabled, Physical link is Up  
 Interface index: 258, SNMP ifIndex: 762, Generation: 2046  
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:  
 None, Loopback: None, Source filtering: Disabled,  
 Flow control: Enabled  
 Device flags : Present Running  
 Interface flags: SNMP-Traps Internal: 0x4000  
 Link flags : None  
 CoS queues : 8 supported, 8 maximum usable queues  
 Hold-times : Up 0 ms, Down 0 ms  
 Current address: 00:1d:b5:f8:6d:eb, Hardware address: 00:1d:b5:f8:6d:eb  
 Last flapped : 2011-12-17 00:19:02 PST (07:36:37 ago)  
 Statistics last cleared: 2011-12-17 07:55:24 PST (00:00:15 ago)  
 Traffic statistics:  
   Input bytes : 110000 0 bps  
   Output bytes : 0 0 bps  
   Input packets: 1000 0 pps  
   Output packets: 0 0 pps  
 IPv6 transit statistics:  
   Input bytes : 110000  
   Output bytes : 0  
   Input packets: 1000

```

Output packets: 0
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0,
 MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 expedited-fo 0 0 0
 2 assured-forw 0 0 0
 3 network-cont 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control

Active alarms : None
Active defects : None
PCS statistics Seconds
 Bit errors 0
 Errored blocks 0
MAC statistics: Receive Transmit
 Total octets 128000 0
 Total packets 1000 0
 Unicast packets 1000 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
Filter statistics:
 Input packet count 1000
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 2
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec

```

```

 0 best-effort 95 9500000000 95 0 low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

Logical interface xe-2/1/0.0 (Index 83) (SNMP ifIndex 1677) (Generation 10082)

Flags: SNMP-Traps 0x4004000 Encapsulation: ENET2
Traffic statistics:
 Input bytes : 110000
 Output bytes : 0
 Input packets: 1000
 Output packets: 0
IPv6 transit statistics:
 Input bytes : 55000
 Output bytes : 0
 Input packets: 500
 Output packets: 0
Local statistics:
 Input bytes : 55000
 Output bytes : 0
 Input packets: 500
 Output packets: 0
Transit statistics:
 Input bytes : 55000 0 bps
 Output bytes : 0 0 bps
 Input packets: 500 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 55000
 Output bytes : 0
 Input packets: 500
 Output packets: 0
Protocol inet6, MTU: 1500, Generation: 23739, Route table: 0
 Addresses, Flags: Is-Preferred Is-Primary
 Destination: 2001:1000:abcd:2312:1432:abcd:1234:0/112, Local:
2001:1000:abcd:2312:1432:abcd:1234:1234
 Generation: 506
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::21d:b5ff:fef8:6deb
Protocol multiservice, MTU: Unlimited, Generation: 508
 Generation: 23740, Route table: 0
 Policer: Input: __default_arp_policer__

```

### show interfaces extensive (IQ2 and IQ2E)

```

user@host> show interfaces ge-3/2/2 extensive
Physical interface: ge-3/2/2, Enabled, Physical link is Up
 Interface index: 156, SNMP ifIndex: 548, Generation: 159
 Link-level type: Ethernet, MTU: 1518, Speed: 1000Mbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
 Flow control: Enabled, Auto-negotiation: Enabled, Remote fault: Online
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 CoS queues : 8 supported, 8 maximum usable queues
 Schedulers : 128
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:14:f6:12:86:fa, Hardware address: 00:14:f6:12:86:fa
 Last flapped : 2010-03-17 04:03:11 PDT (00:45:30 ago)
 Statistics last cleared: Never

```

```

Traffic statistics:
Input bytes : 1716096 0 bps
Output bytes : 1716448 0 bps
Input packets: 13407 0 pps
Output packets: 13411 0 pps
IPv6 total statistics:
Input bytes : 1716096
Output bytes : 1716096
Input packets: 13407
Output packets: 13407
Ingress traffic statistics at Packet Forwarding Engine:
Input bytes : 1716096 0 bps
Input packets: 13407 0 pps
Drop bytes : 0 0 bps
Drop packets: 0 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 1, L2 mismatch timeouts: 0, FIFO errors:
0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets:
0, FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Ingress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped
packets
0 best-effort 13407 13407
0
1 expedited-fo 0 0
0
2 assured-forw 0 0
0
3 network-cont 0 0
0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped
packets
0 best-effort 13407 13407
0
1 expedited-fo 0 0
0
2 assured-forw 0 0
0
3 network-cont 4 4
0
Active alarms : None
Active defects : None
MAC statistics:
Total octets Receive Transmit
1716096 1716448
Total packets 13407 13411
Unicast packets 13407 13407
Broadcast packets 0 0
Multicast packets 0 4
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0

```

```

 Code violations 0
Filter statistics:
 Input packet count 13407
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 13411
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
 Negotiation status: Complete
 Link partner:
 Link mode: Full-duplex, Flow control: None, Remote fault: OK
 Local resolution:
 Flow control: Symmetric, Remote fault: Link OK
Packet Forwarding Engine configuration:
 Destination slot: 3
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort 95 950000000 95 0 low
 none
 3 network-control 5 500000000 5 0 low
 none
 Direction : Input
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort 95 950000000 95 0 low
 none
 3 network-control 5 500000000 5 0 low
 none

Logical interface ge-3/2/2.0 (Index 83) (SNMP ifIndex 6080) (Generation
148)
 Flags: SNMP-Traps 0x4000 VLAN-Tag [0x8100.100] Encapsulation: ENET2
Traffic statistics:
 Input bytes : 0
 Output bytes : 336
 Input packets: 0
 Output packets: 4
IPv6 total statistics:
 Input bytes : 1716096
 Output bytes : 1716096
 Input packets: 13407
 Output packets: 13407
Local statistics:
 Input bytes : 0
 Output bytes : 336
 Input packets: 0
 Output packets: 4
Transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
IPv6 total statistics:
 Input bytes : 1716096
 Output bytes : 0
 Input packets: 0
 Output packets: 0

```



```

 Output bytes : 1716096
 Input packets: 13407
 Output packets: 13407
 Protocol inet6, MTU: 1500, Generation: 159, Route table: 0
 Flags: Is-Primary
 Addresses, Flags: Is-Default Is-Primary
 Destination: Unspecified, Local: 2000::2
 Generation: 146
 Addresses, Flags: Is-Preferred
 Destination: fe80::/64, Local: fe80::214:f600:6412:86fa
 Protocol multiservice, MTU: Unlimited, Generation: 148
 Generation: 160, Route table: 0
 Policer: Input: __default_arp_policer__

Logical interface ge-3/2/2.32767 (Index 84) (SNMP ifIndex 6081) (Generation
149)
 Flags: SNMP-Traps 0x4000 VLAN-Tag [0x0000.0] Encapsulation: ENET2
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 Protocol multiservice, MTU: Unlimited, Generation: 161, Route table: 0
 Flags: None
 Policer: Input: __default_arp_policer__

```

### show interfaces extensive (100-Gigabit Ethernet Type 4 PIC with CFP)

```

user@host> show interfaces et-0/0/0:0 extensive
Physical interface: et-0/0/0:0, Enabled, Physical link is Down
 Interface index: 156, SNMP ifIndex: 516, Generation: 163
 Link-level type: Ethernet, MTU: 9192, Speed: 50000mbps, BPDU Error: None,
 MAC-REWRITE Error: None,
 Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running Down
 Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Damping : half-life: 5 sec, max-suppress: 20 sec, reuse 1000, suppress:
2000, state: enabled
 Current address: 00:aa:aa:aa:aa:00, Hardware address: 00:21:59:5c:48:00
 Last flapped : 2010-01-07 16:36:49 PST (18:02:35 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0

```

```

Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0,
L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors:
0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0,
HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 8 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 DEFAULT, NC- 0 0 0
1 REALTIME 0 0 0
2 PRIVATE, NC- 0 0 0
3 CONTROL 1253 1253 0
4 BC-H, CLASS_ 0 0 0
5 BC-M, CLASS_ 0 0 0
6 IA, CLASS_V_ 0 0 0
7 CLASS_S_OUTP 0 0 0

Queue Mapped Forwarding Class
0 DEFAULT, NC-Q0
1 REALTIME
2 PRIVATE, NC-Q1
3 CONTROL
4 BC-H, CLASS-Q4
5 BC-M, CLASS-Q5
6 IA, CLASS_V_OUTPUT
7 CLASS_S_OUTPUT
Active alarms : None
Active defects : None
MAC statistics:
Total octets Receive Transmit
Total packets 0 0
Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Packet Forwarding Engine configuration:
Destination slot: 0
CoS information:
Direction : Output

```

| CoS transmit queue | Bandwidth |             |    | Buffer Priority Limit |          |
|--------------------|-----------|-------------|----|-----------------------|----------|
|                    | %         | bps         | %  | usec                  |          |
| 0 best-effort      | 95        | 47500000000 | 95 | 0                     | low none |
| 3 network-control  | 5         | 2500000000  | 5  | 0                     | low none |

```

Logical interface et-0/0/0:0.0 (Index 68) (SNMP ifIndex 546) (Generation 161)
Flags: Deviet-Down SNMP-Traps Encapsulation: ENET2
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol inet, MTU: 9178, Generation: 220, Route table: 0
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 210.160.0/24, Local: 210.160.0.1, Broadcast: 210.160.0.255,
Generation: 192
 Protocol mpls, MTU: 9166, Maximum labels: 3, Generation: 221, Route table: 0

Protocol multiservice, MTU: Unlimited, Generation: 222, Route table: 0
 Policer: Input: __default_arp_policer

```

### show interfaces extensive (PTX5000 Packet Transport Router)

```

user@host> show interfaces et-7/0/0 extensive
Physical interface: et-7/0/0, Enabled, Physical link is Up
 Interface index: 168, SNMP ifIndex: 501, Generation: 171
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, BPDU Error: None,
MAC-REWRITE Error: None,
 Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Damping : half-life: 5 sec, max-suppress: 20 sec, reuse 1000, suppress:
2000, state: enabled
 Current address: 88:e0:f3:3b:de:43, Hardware address: 88:e0:f3:3b:de:43
 Last flapped : 2012-01-18 11:48:24 PST (01:47:08 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 3583014 0 bps
 Output bytes : 758050 0 bps
 Input packets: 17740 0 pps
 Output packets: 3418 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0

```

```

Output packets: 0
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0,
 L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors:
0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0,
 HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 252 252 0

1 expedited-fo 0 0 0

2 assured-forw 0 0 0

3 network-cont 6196 6196 0

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control

Active alarms : None
Active defects : None
MAC statistics:
Total octets Receive Transmit
Total packets 4108825 1159686
Unicast packets 21166 6448
Broadcast packets 14824 3255
Multicast packets 3 0
CRC/Align errors 6339 3193
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 16091
Code violations 0
Filter statistics:
Input packet count 9
Input packet rejects 9
Input DA rejects 9
Input SA rejects 0
Output packet count 0
Output packet pad count 0
Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
Negotiation status: Incomplete
Packet Forwarding Engine configuration:
Destination slot: 7
CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec

```

```

 0 best-effort 95 9500000000 95 0 low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

### show interfaces extensive (MX Series Routers)

```

user@host> show interfaces xe-0/0/0 extensive
Physical interface: xe-0/0/0, Enabled, Physical link is Up
 Interface index: 145, SNMP ifIndex: 592, Generation: 148
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:
None,
 Loopback: None, Source filtering: Disabled, Flow control: Enabled
 Pad to minimum frame size: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 08:81:f4:82:a3:f0, Hardware address: 08:81:f4:82:a3:f0
 Last flapped : 2013-10-26 03:20:40 test (2w3d 03:15 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
Dropped traffic statistics due to STP State:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
 L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors:
0,
 Resource errors: 0
Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 0 0 0
 1 0 0 0
 2 0 0 0
 3 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding

```

```

 2 assured-forwarding
 3 network-control
Active alarms : LINK
Active defects : LINK
PCS statistics Seconds
 Bit errors 109
 Errored blocks 109
MAC statistics: Receive Transmit
 1 0 0 0
 2 0 0 0
 3 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
Active alarms : LINK
Active defects : LINK
PCS statistics Seconds
 Bit errors 109
 Errored blocks 109
MAC statistics: Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
 Total errors 0 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec low
 0 best-effort 95 9500000000 95 0 low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

## show interfaces extensive (MX480 Router with MPC5E and 10-Gigabit Ethernet OTN Interface)

```

user@host> show interfaces xe-0/0/3 extensive
Physical interface: xe-0/0/3, Enabled, Physical link is Up
 Interface index: 200, SNMP ifIndex: 577, Generation: 203
 Link-level type: Ethernet, MTU: 1514, MRU: 1522, LAN-PHY mode, Speed: 10Gbps,
 BPDU Error: None, MAC-REWRITE Error: None, Loopback: None, Source filtering:
 Disabled, Flow control: Enabled
 Pad to minimum frame size: Disabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Schedulers : 0
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:23:9c:fc:98:03, Hardware address: 00:23:9c:fc:98:03
 Last flapped : 2014-06-26 18:16:50 PDT (04:58:35 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Dropped traffic statistics due to STP State:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
 Resource errors: 0
 Output errors:
 Carrier transitions: 5, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
 Egress queues: 8 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 0 0 0
 1 0 0 0
 2 0 0 0
 3 0 0 0

 Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
 Active alarms : None
 Active defects : None
 PCS statistics
 Bit errors Seconds
 Errored blocks 0
 4

```

```

MAC statistics:
 Total octets Receive Transmit
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
 Total errors 0 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
 CoS transmit queue
Limit % bps % Buffer Priority
0 best-effort 95 9500000000 95 0 low
none
3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces extensive (MX480 Router with MPC5E and 100-Gigabit Ethernet OTN Interface)

```

user@host> show interfaces et-2/1/0 extensive
Physical interface: et-2/1/0, Enabled, Physical link is Up
 Interface index: 215, SNMP ifIndex: 872, Generation: 218
 Link-level type: Ethernet, MTU: 1514, MRU: 1522, Speed: 100Gbps, BPDU Error:
None, Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled
 Pad to minimum frame size: Disabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Schedulers : 0
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:23:9c:fc:9a:e6, Hardware address: 00:23:9c:fc:9a:e6
 Last flapped : 2014-06-26 18:42:04 PDT (04:36:58 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:

```



```

Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
Carrier transitions: 263, Errors: 0, Drops: 0, Collisions: 0, Aged packets:
0, FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 0 0 0
1 0 0 0
2 0 0 0
3 0 0 0

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control
Active alarms : None
Active defects : None
PCS statistics Seconds
Bit errors 0
Errored blocks 754
MAC statistics: Receive Transmit
Total octets 14960 0
Total packets 104 0
Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 2
Fragment frames 6
VLAN tagged frames 0
Code violations 0
Total errors 98 0
Filter statistics:
Input packet count 104
Input packet rejects 0
Input DA rejects 0
Input SA rejects 0
Output packet count 0
Output packet pad count 0
Output packet error count 0

```

```

 CAM destination filters: 0, CAM source filters: 0
OTN alarms : None
OTN defects : None
OTN FEC Mode : GFEC
OTN Rate : OTU4 100Gbps
OTN Line Loopback : None
OTN Local Loopback: None
OTN Payload PRBS : None
OTN FEC statistics:
 Corrected Errors 169828399453
 Uncorrected Words 28939961456
 Corrected Error Ratio (17963 sec average) 8.46e-05
OTN FEC alarms: Seconds Count State
 FEC Degrade 1180 3 OK
 FEC Excessive 1160 5 OK
OTN OC: Seconds Count State
 LOS 129 1 OK
 LOF 2 1 OK
 LOM 0 0 OK
 Wavelength Lock 0 0 OK
OTN OTU:
 AIS 0 0 OK
 BDI 7 1 OK
 IAE 0 0 OK
 TTIM 168 45 OK
 BIAE 0 0 OK
 TSF 0 0 OK
 SSF 0 0 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN ODU:
 AIS 130 1 OK
 OCI 0 0 OK
 LCK 0 0 OK
BDI 7 1 OK
 TTIM 133 1 OK
 IAE 0 0 OK
 LTC 0 0 OK
 CSF 8 4 OK
 TSF 0 0 OK
 SSF 0 0 OK
 PTIM 130 1 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN Received Overhead Bytes:
 APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
 Payload Type: 0x00
ODU Delay Management :
 Result : 0x00

```

```

PRBS:
 Result: Test not enabled
OTN Transmitted Overhead Bytes:
 APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
 Payload Type: 0x00
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 % bps % usec
 0 best-effort 95 95000000000 95 0 low
none
 3 network-control 5 5000000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces extensive ((MX960 Router with MPC3E and 100-Gigabit DWDM OTN MIC)

```

user@host> show interfaces et-3/0/0 extensive
Physical interface: et-3/0/0, Enabled, Physical link is Up
 Interface index: 163, SNMP ifIndex: 564, Generation: 166
 Link-level type: Ethernet, MTU: 1514, MRU: 1522, Speed: 100Gbps, BPDU Error:
None, Loopback: Disabled, Source filtering:
Disabled,
 Flow control: Enabled
 Pad to minimum frame size: Disabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 Wavelength : 1550.12 nm, Frequency: 193.40 THz
 CoS queues : 8 supported, 8 maximum usable queues
 Schedulers : 0
 Hold-times : Up 0 ms, Down 0 ms
 Damping : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0,
state: unsuppressed
 Current address: dc:38:e1:18:9e:2f, Hardware address: dc:38:e1:18:9e:2f
 Last flapped : 2016-02-17 14:26:31 PST (09:04:28 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Dropped traffic statistics due to STP State:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 5, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

```

```

FIFO errors: 0, HS link CRC errors: 0, MTU
errors: 0,
 Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 0 0 0
 1 0 0 0
 2 0 0 0
 3 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control

Active alarms : None
Active defects : None
PCS statistics Seconds
 Bit errors 8
 Errored blocks 10
MAC statistics: Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
 Total errors 0 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
OTN alarms : None
OTN defects : None
OTN FEC Mode : SDFEC
OTN Rate : OTU4 (120.5Gbps)
OTN Line Loopback : None
OTN Local Loopback: None
OTN Payload PRBS : None
OTN Laser Enable : On
OTN FEC statistics:
 Corrected Errors 7065332638
 Uncorrected Words 3412572
 Corrected Error Ratio (32785 sec average) 1.79e-06 (INVALID)

```

```

OTN FEC alarms: Seconds Count State
 FEC Degrade 0 0 OK
 FEC Excessive 3 1 OK
OTN OC: Seconds Count State
 LOS 3 1 OK
 LOF 50 3 OK
 LOM 3 3 OK
 Wavelength Lock 0 0 OK
OTN OTU:
 AIS 0 0 OK
 BDI 4 4 OK
 IAE 4 4 OK
 TTIM 1 1 OK
 BIAE 3 3 OK
 TSF 50 3 OK
 SSF 50 3 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN ODU:
 AIS 20 2 OK
 OCI 4 4 OK
 LCK 4 4 OK
 BDI 2 2 OK
 TTIM 20 2 OK
 IAE 0 0 OK
 LTC 0 0 OK
 CSF 18 2 OK
 TSF 66 2 OK
 SSF 66 2 OK
 PTIM 43 2 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN Received Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
 Payload Type: 0x07
ODU Delay Management :
 Result : 0ms
PRBS:
 Result: Test not enabled
OTN Transmitted Overhead Bytes:
 APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
 Payload Type: 0x07
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec

```

```

 0 best-effort 95 95000000000 95 0 low
none
 3 network-control 5 5000000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces extensive (PTX3000 Router with 5-port 100-Gigabit DWDM OTN PIC)

```

user@host > show interfaces extensive et-4/0/0
Physical interface: et-4/0/0, Enabled, Physical link is Up
 Interface index: 148, SNMP ifIndex: 544, Generation: 161
 Link-level type: Ethernet, MTU: 1514, Speed: 100Gbps, BPDU Error: None, Loopback:
 Disabled, Source filtering: Disabled,
 Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x4000
 Link flags : None
 Wavelength : 1550.12 nm, Frequency: 193.40 THz
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Damping : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0,
state: unsuppressed
 Current address: 54:4b:8c:64:9f:70, Hardware address: 54:4b:8c:64:9f:70
 Last flapped : 2016-06-04 21:42:42 PDT (1d 05:09 ago)
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
 L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
 Output errors:
 Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
 FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0,
 Resource errors: 0
 Egress queues: 8 supported, 4 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 0 0 0
 1 0 0 0
 2 0 0 0
 3 0 0 0

 Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
 Active alarms : None
 Active defects : None

```

```

PCS statistics Seconds
 Bit errors 7
Errored blocks 10
MAC statistics: Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
OTN alarms : None
OTN defects : None
OTN FEC Mode : SDFEC
OTN Rate : OTU4 (120.5Gbps)
OTN Line Loopback : None
OTN Local Loopback: None
OTN Payload PRBS : None
OTN Laser Enable : On
OTN FEC statistics:
 Corrected Errors 19637746
 Uncorrected Words 0
 Corrected Error Ratio (104923 sec average) 1.55e-09
OTN FEC alarms: Seconds Count State
 FEC Degrade 0 0 OK
 FEC Excessive 0 0 OK
OTN OC: Seconds Count State
 LOS 0 0 OK
 LOF 2 1 OK
 LOM 2 1 OK
 Wavelength Lock 0 0 OK
OTN OTU:
 AIS 0 0 OK
 BDI 2 1 OK
 IAE 0 0 OK
 TTIM 0 0 OK
 BIAE 0 0 OK
 TSF 2 1 OK
 SSF 0 0 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

```

Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN ODU:
AIS 0 0 OK
OCI 0 0 OK
LCK 0 0 OK
BDI 2 1 OK
TTIM 0 0 OK
IAE 0 0 OK
LTC 0 0 OK
CSF 0 0 OK
TSF 2 1 OK
SSF 0 0 OK
PTIM 2 1 OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Received SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN Received Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
Payload Type: 0x07
ODU Delay Management :
Result : 0ms
PRBS:
Result: Test not enabled
OTN Transmitted Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
Payload Type: 0x07
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec low
0 best-effort 95 95000000000 95 0 low
none
3 network-control 5 5000000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces extensive (MX2020 Router with MPC6E and OTN MIC)

```

user@host> show interfaces xe-3/0/0 extensive
Physical interface: xe-3/0/0, Enabled, Physical link is Up
Interface index: 166, SNMP ifIndex: 516, Generation: 169
Link-level type: Ethernet, MTU: 1514, MRU: 1522, LAN-PHY mode, Speed: 10Gbps,
BPDU Error:
None, MAC-REWRITE Error: None, Loopback: None, Source filtering: Disabled, Flow
control:
Enabled
Pad to minimum frame size: Disabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms

```



```

Current address: 4c:96:14:72:22:63, Hardware address: 4c:96:14:72:22:63
Last flapped : 2014-05-28 17:53:12 PDT (05:56:24 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes:
0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors:
0
Output errors:
Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO
errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 0 0 0

1 expedited-forwarding 0 0
0
2 assured-forwarding 0 0
0
3 network-control 0 0
0
Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control
Active alarms : None
Active defects : None
PCS statistics Seconds
Bit errors 2
Errored blocks 2
MAC statistics: Receive Transmit
Total octets 0 0
Total packets 0 0
Unicast packets 0 0
Broadcast packets 0 0
Multicast packets 0 0
CRC/Align errors 0 0
FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0

```

```

VLAN tagged frames 0
Code violations 0
Total errors 0 0
Filter statistics:
Input packet count 0
Input packet rejects 0
Input DA rejects 0
Input SA rejects 0
Output packet count 0 0
Output packet pad count 0 0
Output packet error count 0 0
CAM destination filters: 0, CAM source filters: 0
OTN alarms : None
OTN defects : None
OTN FEC Mode : GFEC
OTN Rate : Fixed Stuff Bytes 11.0957Gbps
OTN Line Loopback : None
OTN Local Loopback : None
OTN Payload PRBS : None
OTN FEC statistics:
Corrected Errors 0
Uncorrected Words 0
Corrected Error Ratio (21387 sec average) 0.00e+00
OTN FEC alarms: Seconds Count State
FEC Degrade 0 0 OK
FEC Excessive 0 0 OK
OTN OC: Seconds Count State
LOS 0 0 OK
LOF 0 0 OK
LOM 0 0 OK
Wavelength Lock 0 0 OK
OTN OTU:
AIS 0 0 OK
BDI 0 0 OK
IAE 0 0 OK
TTIM 0 0 OK
BIAE 0 0 OK
TSF 0 0 OK
SSF 0 0 OK
Received DAPI:
00 53 4d 2d 54 52 43 20 44 41 50 49 2d 53 45 43 .SM-TRC DAPI-SEC
Received SAPI:
00 53 4d 2d 54 52 43 20 53 41 50 49 2d 53 45 43 .SM-TRC SAPI-SEC
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN ODU:
AIS 0 0 OK
OCI 0 0 OK
LCK 0 0 OK
BDI 0 0 OK
TTIM 0 0 OK
IAE 0 0 OK
LTC 0 0 OK
CSF 0 0 OK
TSF 0 0 OK
SSF 0 0 OK
PTIM 0 0 OK
Received DAPI:
00 50 4d 2d 54 52 43 20 44 41 50 49 2d 53 45 43 .PM-TRC DAPI-SEC

```

```

Received SAPI:
00 50 4d 2d 54 52 43 20 53 41 50 49 2d 53 45 43 .PM-TRC SAPI-SEC
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OTN Received Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
Payload Type: 0x00
ODU Delay Management :
Result : 0x00
PRBS:
Result: Test not enabled
OTN Transmitted Overhead Bytes:
APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
Payload Type: 0x00
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort % bps % usec low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

#### show interfaces extensive (MX2010 Router with MPC6E and 100-Gigabit Ethernet OTN Interface)

```

user@host> show interfaces et-9/0/0 extensive
Physical interface: et-9/0/0, Enabled, Physical link is Up
Interface index: 196, SNMP ifIndex: 623, Generation: 199
Link-level type: Ethernet, MTU: 1514, MRU: 1522, Speed: 100Gbps, BPDU Error:
None, Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled
Pad to minimum frame size: Disabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 3c:8a:b0:38:6e:f6, Hardware address: 3c:8a:b0:38:6e:f6
Last flapped : 2014-06-26 18:18:34 PDT (04:17:07 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

```

```

Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
 Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 0 0 0
 1 0 0 0
 2 0 0 0
 3 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
Active alarms : None
Active defects : None
PCS statistics Seconds
 Bit errors 0
 Errored blocks 0
MAC statistics: Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
 Total errors 0 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
 CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort % bps % usec low
 95 950000000000 95 0

```

```

none
3 network-control 5 5000000000 5 0 low
none
Interface transmit statistics: Disabled

```

### show interfaces extensive (MX2010 Router with MPC6E and 10-Gigabit Ethernet Interface)

```

user@host> show interfaces xe-6/1/0 extensive
Physical interface: xe-6/1/0, Enabled, Physical link is Up
Interface index: 159, SNMP ifIndex: 603, Generation: 162
Link-level type: Ethernet, MTU: 1514, MRU: 1522, LAN-PHY mode, Speed: 10Gbps,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: None, Source filtering:
Disabled, Flow control: Enabled
Pad to minimum frame size: Disabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Schedulers : 0
Hold-times : Up 0 ms, Down 0 ms
Current address: 3c:8a:b0:38:6c:d5, Hardware address: 3c:8a:b0:38:6c:d5
Last flapped : 2014-06-26 18:16:50 PDT (04:21:04 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets : 0 0 pps
Output packets : 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets : 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets : 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 0 0 0

1 0 0 0

2 0 0 0

3 0 0 0

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding

```

```

3 network-control
Active alarms : None
Active defects : None
PCS statistics Seconds
 Bit errors 0
 Errored blocks 1
MAC statistics: Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
VLAN tagged frames 0
Code violations 0
Total errors 0 0
Filter statistics:
 Input packet count 0
 Input packet rejects 0
 Input DA rejects 0
 Input SA rejects 0
 Output packet count 0
 Output packet pad count 0
 Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
CoS transmit queue Bandwidth Buffer Priority
Limit % bps % usec
 0 best-effort 95 9500000000 95 0 low
none
 3 network-control 5 500000000 5 0 low
none
Interface transmit statistics: Disabled

```

### show interfaces extensive (T4000 Routers with Type 5 FPCs)

The output fields for the **show interfaces *interface* extensive** command remains the same for 12-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-12XGE-SFPP), 24-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-24XGE-SFPP), and 100-Gigabit Ethernet Type 5 PIC with CFP (PF-1CGE-CFP).

```

user@host> show interfaces xe-4/0/0 extensive
Physical interface: xe-4/0/0, Enabled, Physical link is Up
Interface index: 200, SNMP ifIndex: 592, Generation: 203
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:
None, Loopback: None, Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues

```

```

Hold-times : Up 0 ms, Down 0 ms
Damping : half-life: 5 sec, max-suppress: 20 sec, reuse 1000, suppress:
2000, state: enabled
Current address: 00:12:1e:37:53:f8, Hardware address: 00:12:1e:37:53:f8
Last flapped : 2013-06-03 16:01:56 PDT (06:04:07 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0

 1 expedited-fo 0 0 0

 2 assured-forw 0 0 0

 3 network-cont 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 expedited-forwarding
 2 assured-forwarding
 3 network-control
Active alarms : None
Active defects : None
PCS statistics
 Bit errors 0
 Errored blocks 0
MAC statistics:
 Receive Transmit
 Total octets 0 0
 Total packets 0 0
 Unicast packets 0 0
 Broadcast packets 0 0
 Multicast packets 0 0
 CRC/Align errors 0 0
 FIFO errors 0 0
 MAC control frames 0 0
 MAC pause frames 0 0
 Oversized frames 0
 Jabber frames 0
 Fragment frames 0
 VLAN tagged frames 0
 Code violations 0
Filter statistics:
 Input packet count 0

```

```

Input packet rejects 0
Input DA rejects 0
Input SA rejects 0
Output packet count 0
Output packet pad count 0
Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0 (0x00)
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 95 9500000000 95 0 low none
3 network-control 5 500000000 5 0 low none
Preclassifier statistics:
Traffic Class Received Packets Transmitted Packets Dropped Packets

real-time 0 0 0
network-control 0 0 0
best-effort 0 0 0
Interface transmit statistics: Disabled

```

#### show interfaces extensive (Aggregated Ethernet)

```

user@host> show interfaces ae0 extensive
Physical interface: ae0, Enabled, Physical link is Up
Interface index: 199, SNMP ifIndex: 570, Generation: 202
Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled, Minimum links needed: 1, Minimum bandwidth needed: 0
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: 2c:6b:f5:d1:0f:c0, Hardware address: 2c:6b:f5:d1:0f:c0
Last flapped : 2012-06-06 23:33:03 PDT (00:00:58 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 18532 1984 bps
Output bytes : 0 0 bps
Input packets: 158 2 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0,
Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Ingress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

```



```

0 best-effort 0 0 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 0 0 0

Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 57 57 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 63605 63605 0

Queue number: Mapped forwarding classes
0 best-effort
1 expedited-forwarding
2 assured-forwarding
3 network-control

Logical interface ae0.0 (Index 331) (SNMP ifIndex 583) (Generation 142)
Flags: SNMP-Traps 0x4004000 Encapsulation: ENET2
Statistics Packets pps Bytes bps
Bundle:
 Input : 149 2 17416 1984
 Output: 0 0 0 0
Link:
 ge-3/2/5.0
 Input : 90 1 10100 992
 Output: 0 0 0 0
 ge-3/3/9.0
 Input : 59 1 7316 992
 Output: 0 0 0 0
LACP info: Role System System Port
Port Port
 priority identifier priority number
key
ge-3/2/5.0 Actor 100 00:00:00:00:00:01 127 1
1
ge-3/2/5.0 Partner 127 00:24:dc:98:67:c0 127 1 1
ge-3/3/9.0 Actor 100 00:00:00:00:00:01 127 2
1
ge-3/3/9.0 Partner 127 00:24:dc:98:67:c0 127 2 1

LACP Statistics: LACP Rx LACP Tx Unknown Rx Illegal Rx
ge-3/2/5.0 38 137 0 0
ge-3/3/9.0 36 139 0 0
Marker Statistics: Marker Rx Resp Tx Unknown Rx Illegal Rx
ge-3/2/5.0 0 0 0 0
ge-3/3/9.0 0 0 0 0
Protocol inet, MTU: 1500, Generation: 169, Route table: 0
Flags: Sendbcst-pkt-to-re
Addresses, Flags: Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.2, Broadcast: 1.1.1.255, Generation:

```

153

```
Protocol multiservice, MTU: Unlimited, Generation: 170, Route table: 0
Flags: Is-Primary
Policer: Input: __default_arp_policer__
```

## Sample Output

## show interfaces lsi (Label-Switched Interface)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show interfaces <i>interface-type</i><br><brief   detail   extensive   terse><br><descriptions><br><media><br><routing-instance <i>instance-name</i> ><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display status information about the specified label-switched interface (LSI).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><i>interface-type</i>—On most routers, the interface type is <i>lt-fpc/pic/port</i>.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>routing-instance <i>instance-name</i></b>—(Optional) Display information for the specified routing instance.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show interfaces lsi extensive on page 1331</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 66 on page 1329</a> lists the output fields for the <b>show interfaces</b> (logical tunnel) command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 66: Logical Tunnel show interfaces Output Fields**

| Field Name                | Field Description               | Level of Output |
|---------------------------|---------------------------------|-----------------|
| <b>Physical Interface</b> |                                 |                 |
| Physical interface        | Name of the physical interface. | All levels      |
| <b>Logical Interface</b>  |                                 |                 |
| Logical interface         | Name of the logical interface.  | All levels      |

Table 66: Logical Tunnel show interfaces Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output              |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Index              | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| SNMP ifIndex       | SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| Generation         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| Flags              | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| Encapsulation      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels                   |
| Traffic statistics | <p>Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Rate of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Rate of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Rate of packets received on the interface.</li> <li>• <b>Output packets</b>—Rate of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b>      |
| Local statistics   | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>      |
| Transit statistics | Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| Protocol           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| MTU                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| Generation         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>      |
| Flags              | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <a href="#">“Common Output Fields Description” on page 958</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |

## Sample Output

### show interfaces lsi extensive

```
user@host> show interfaces lsi extensive
```

```
Physical interface: lsi
```

```
Logical interface lsi.84934656 (Index 363) (SNMP ifIndex 586) (Generation 194)
```

```
Flags: Up Point-To-Point SNMP-Traps 0x4000000 Encapsulation: LSI-NULL
```

```
Traffic statistics:
```

```
Input bytes : 0
```

```
Output bytes : 0
```

```
Input packets: 0
```

```
Output packets: 0
```

```
Local statistics:
```

```
Input bytes : 0
```

```
Output bytes : 0
```

```
Input packets: 0
```

```
Output packets: 0
```

```
Transit statistics:
```

```
Input bytes : 0 0 bps
```

```
Output bytes : 0 0 bps
```

```
Input packets: 0 0 pps
```

```
Output packets: 0 0 pps
```

```
Protocol vpls, MTU: Unlimited, Generation: 279, Route table: 10
```

```
Logical interface lsi.84934657 (Index 366) (SNMP ifIndex 589) (Generation 197)
```

```
Flags: Up Point-To-Point SNMP-Traps 0x4000000 Encapsulation: LSI-NULL
```

```
Traffic statistics:
```

```
Input bytes : 0
```

```
Output bytes : 0
```

```
Input packets: 0
```

```
Output packets: 0
```

```
Local statistics:
```

```
Input bytes : 0
```

```
Output bytes : 0
```

```
Input packets: 0
```

```
Output packets: 0
```

```
Transit statistics:
```

```
Input bytes : 0 0 bps
```

```
Output bytes : 0 0 bps
```


```
Input packets: 0 0 pps
```

```
Output packets: 0 0 pps
```

```
Protocol vpls, MTU: Unlimited, Generation: 282, Route table: 10
```

## show interfaces media

---

|                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                                                                                                                                                                                                                                                                                   | show interfaces media                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Release Information                                                                                                                                                                                                                                                                      | Command introduced before Junos OS Release 7.4.<br>Command introduced on PTX Series Packet Transport Routers for Junos OS Release 12.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description                                                                                                                                                                                                                                                                              | Display media-specific information about all configured network interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <div> <b>NOTE:</b> <code>show interfaces media</code> lists details for all interfaces, whereas <code>show interfaces media interface-name</code> lists details only for the specified interface.</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Options                                                                                                                                                                                                                                                                                  | This command has no options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Additional Information                                                                                                                                                                                                                                                                   | Output from both the <code>show interfaces interface-name detail</code> and the <code>show interfaces interface-name extensive</code> commands includes all the information displayed in the output from the <code>show interfaces media</code> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Required Privilege Level                                                                                                                                                                                                                                                                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| List of Sample Output                                                                                                                                                                                                                                                                    | <a href="#">show interfaces media (SONET/SDH) on page 1332</a><br><a href="#">show interfaces media (MX Series Routers) on page 1333</a><br><a href="#">show interfaces media (PTX Series Packet Transport Routers) on page 1333</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Output Fields                                                                                                                                                                                                                                                                            | <p>The output from the <code>show interfaces media</code> command includes fields that display interface media-specific information. These fields are also included in the <code>show interfaces interface-name</code> command for each particular interface type, and the information provided in the fields is unique to each interface type.</p> <p>One field unique to the <code>show interfaces media</code> command is <b>interface-type errors</b> (for example, <b>SONET errors</b>). This field appears for channelized E3, channelized T3, channelized OC, E1, E3, SONET, T1, and T3 interfaces. The information provided in this output field is also provided in the output from the <code>show interfaces interface-name</code> command. (For example, for SONET interfaces, these fields are <b>SONET section</b>, <b>SONET line</b>, and <b>SONET path</b>). For a description of errors, see the chapter with the particular interface type in which you are interested.</p> |

## Sample Output

### show interfaces media (SONET/SDH)

The following example displays the output fields unique to the `show interfaces media` command for a SONET interface (with no level of output specified):

```
user@host> show interfaces media so-4/1/2
```

```

Physical interface: so-4/1/2, Enabled, Physical link is Up
 Interface index: 168, SNMP ifIndex: 495
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC48,
 Loopback: None, FCS: 16, Payload scrambler: Enabled
 Device flags : Present Running
 Interface flags: Point-To-Point SNMP-Traps 16384
 Link flags : Keepalives
 Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
 Keepalive: Input: 1783 (00:00:00 ago), Output: 1786 (00:00:08 ago)
 LCP state: Opened
 NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
 mpls: Not-configured
 CHAP state: Not-configured
 CoS queues : 8 supported
 Last flapped : 2005-06-15 12:14:59 PDT (04:31:29 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 SONET alarms : None
 SONET defects : None
 SONET errors:
 BIP-B1: 121, BIP-B2: 916, REI-L: 0, BIP-B3: 137, REI-P: 16747, BIP-BIP2: 0
 Received path trace: routerb so-1/1/2
 Transmitted path trace: routera so-4/1/2

```

#### show interfaces media (MX Series Routers)

```

user@host>show interfaces media xe-0/0/0
Physical interface: xe-0/0/0, Enabled, Physical link is Up
 Interface index: 145, SNMP ifIndex: 592
 Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:
 None,
 Loopback: None, Source filtering: Disabled, Flow control: Enabled
 Pad to minimum frame size: Enabled
 Device flags : Present Running
 Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues
 Current address: 08:81:f4:82:a3:f0, Hardware address: 08:81:f4:82:a3:f0
 Last flapped : 2013-10-26 03:20:40 test (1w6d 00:19 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Active alarms : LINK
 Active defects : LINK
 PCS statistics
 Bit errors Seconds
 Errored blocks 78
 MAC statistics:
 Input bytes: 0, Input packets: 0, Output bytes: 0, Output packets: 0
 Filter statistics:
 Filtered packets: 0, Padded packets: 0, Output packet errors: 0
 Interface transmit statistics: Disabled

```

#### show interfaces media (PTX Series Packet Transport Routers)

```

user@host> show interfaces media em0
Physical interface: em0, Enabled, Physical link is Up
 Interface index: 8, SNMP ifIndex: 0
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex

```

Current address: 00:80:f9:25:00:1b, Hardware address: 00:80:f9:25:00:1b  
Last flapped : Never  
Input packets : 215151  
Output packets: 72



## show interfaces terse

|                                 |                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show interfaces terse                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced on PTX Series Packet Transport Routers for Junos OS Release 12.1.                                                                                      |
| <b>Description</b>              | Display summary information about interfaces.                                                                                                                                                                                |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                 |
| <b>Additional Information</b>   | Interfaces are always displayed in numerical order, from the lowest to the highest FPC slot number. Within that slot, the lowest PIC slot is shown first. On an individual PIC, the lowest port number is always first.      |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Examples: Configuring Logical System Interfaces</i></li> </ul>                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">show interfaces terse on page 1336</a><br><a href="#">show interfaces terse (TX Matrix Plus Router) on page 1336</a><br><a href="#">show interfaces terse (PTX Series Packet Transport Routers) on page 1337</a> |
| <b>Output Fields</b>            | <a href="#">Table 67 on page 1335</a> lists the output fields for the <b>show interfaces terse</b> command. Output fields are listed in the approximate order in which they appear.                                          |

**Table 67: show interfaces terse Output Fields**

| Field Name       | Field Description                                                                                                                                       |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interface</b> | Interface name.                                                                                                                                         |
| <b>Admin</b>     | Whether the interface is turned on (up) or off (down).                                                                                                  |
| <b>Link</b>      | Link state: <b>up</b> or <b>down</b> .                                                                                                                  |
| <b>Proto</b>     | Protocol family configured on the logical interface. A logical interface on a router that supports Ethernet OAM always shows the multiservice protocol. |
| <b>Local</b>     | Local IP address of the logical interface.                                                                                                              |
| <b>Remote</b>    | Remote IP address of the logical interface.                                                                                                             |

## Sample Output

### show interfaces terse

```

user@host> show interfaces terse
Interface Admin Link Proto Local Remote
t1-0/1/0:0 up up
t1-0/1/0:0.0 up up inet 192.168.220.18/30
t1-0/1/0:1 up up
t1-0/1/0:2 up up
t1-0/1/0:3 up up
at-1/0/0 up up
at-1/0/1 up up
dsc up up
fxp0 up up
fxp0.0 up up inet 192.168.71.249/21
fxp1 up up
fxp1.0 up up inet 10.0.0.4/8
 tnp 4
gre up up
ipip up up
lo0 up up
lo0.0 up up inet 10.0.1.4 --> 0/0
 127.0.0.1 --> 0/0
lo0.16385 up up inet
lsi up up
mtun up up

```

### show interfaces terse (TX Matrix Plus Router)

```

user@host> show interfaces terse
Interface Admin Link Proto Local Remote
xe-0/0/0 up up
xe-0/0/1 up up
xe-0/0/2 up up
xe-0/0/3 up up
xe-6/0/0 up up
xe-6/0/1 up up
xe-6/0/2 up up
xe-6/0/3 up up
xe-6/1/0 up up
xe-6/1/1 up up
xe-6/1/2 up up
xe-6/1/3 up up
so-0/0/0 up up
so-0/0/0.0 up up inet 1.1.1.1/30
ge-1/3/0.0 up up inet --> 0/0
ge-7/0/0 up up
ge-7/0/0.0 up up inet 2.15.1.1/30
ge-7/0/0.1 up up inet 2.15.1.5/30
ge-7/0/0.2 up up inet 2.15.1.9/30
ge-7/0/0.3 up up inet 2.15.1.13/30
ge-7/0/0.4 up up inet 2.15.1.17/30
ge-7/0/0.5 up up inet 2.15.1.21/30
...
em0 up up
em0.0 up up inet 192.168.178.11/25
gre up up

```

```

ipip up up
ixgbe0 up up
ixgbe0.0 up up inet 10.34.0.4/8
 162.0.0.4/2
 inet6 fe80::200:ff:fe22:4/64
 fec0::a:22:0:4/64
 tnp 0x22000004
ixgbe1 up up
ixgbe1.0 up up inet 10.34.0.4/8
 162.0.0.4/2
 inet6 fe80::200:1ff:fe22:4/64
 fec0::a:22:0:4/64
 tnp 0x22000004

```

#### show interfaces terse (PTX Series Packet Transport Routers)

```

user@host> show interfaces em0 terse

```

| Interface | Admin | Link | Proto | Local           | Remote |
|-----------|-------|------|-------|-----------------|--------|
| em0       | up    | up   |       |                 |        |
| em0.0     | up    | up   | inet  | 192.168.3.30/24 |        |



## CHAPTER 15

# ANCP Operational Commands

- `clear ancp neighbor`
- `clear ancp statistics`
- `clear ancp subscriber`
- `request ancp oam interface`
- `request ancp oam neighbor`
- `show ancp cos`
- `show ancp neighbor`
- `show ancp statistics`
- `show ancp subscriber`
- `show ancp summary`
- `show ancp summary neighbor`
- `show ancp summary subscriber`

## clear ancp neighbor

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>clear ancp neighbor</b><br><b>&lt;ip-address <i>ip-address</i>&gt;</b><br><b>&lt;system-name <i>mac-address</i>&gt;</b>                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Clear the ANCP agent connection with all ANCP neighbors or with the specified ANCP neighbor. This command deletes information for subscribers associated with the neighbor, causing the adjusted traffic rates to revert to the configured rate for the subscriber interfaces. The neighbor remains configured (its administrative state is <i>enabled</i> ) and can reestablish adjacencies. |
| <b>Options</b>                  | <b>none</b> —Clear all ANCP neighbors.<br><br><b>ip-address <i>ip-address</i></b> —(Optional) Clear the ANCP neighbor specified by the IP address.<br><br><b>system-name <i>mac-address</i></b> —(Optional) Clear the ANCP neighbor specified by the MAC address.                                                                                                                             |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show ancp neighbor on page 1353</a></li></ul>                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">clear ancp neighbor on page 1340</a><br><a href="#">show ancp neighbor on page 1340</a>                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>            | When you enter this command, you are provided no feedback on the status of your request. You can enter the <b>show ancp neighbor</b> command before and after clearing the ANCP neighbors to verify the clear operation.                                                                                                                                                                      |

## Sample Output

### clear ancp neighbor

```
user@host> clear ancp neighbor
```

### show ancp neighbor

The following sample output displays the connections with ANCP neighbors before and after the **clear ancp neighbor** command was issued.

```
user@host> show ancp neighbor
```

| IP Address | MAC Address       | State       | Subscriber Count | Capabilities |
|------------|-------------------|-------------|------------------|--------------|
| 10.10.10.2 | ba:ad:be:ef:10:10 | Established | 5                | Topo         |
| 12.12.12.2 | ba:ad:be:ef:10:12 | Established | 5                | Topo         |
| 13.13.13.2 | ba:ad:be:ef:10:13 | Established | 5                | Topo         |

|            |                   |             |   |      |
|------------|-------------------|-------------|---|------|
| 14.14.14.2 | ba:ad:be:ef:10:14 | Established | 5 | Topo |
|------------|-------------------|-------------|---|------|

```
user@host> clear ancp neighbor ip-address 10.10.10.2
```

```
user@host> show ancp neighbor
```

| IP Address | MAC Address       | State       | Subscriber<br>Count | Capabilities |
|------------|-------------------|-------------|---------------------|--------------|
| 12.12.12.2 | ba:ad:be:ef:10:12 | Established | 5                   | Topo         |
| 13.13.13.2 | ba:ad:be:ef:10:13 | Established | 5                   | Topo         |
| 14.14.14.2 | ba:ad:be:ef:10:14 | Established | 5                   | Topo         |

## clear ancp statistics

---

|                          |                                                                                                                                                                                                                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <b>clear ancp statistics</b><br><b>&lt;ip-address <i>ip-address</i>&gt;</b><br><b>&lt;system-name <i>mac-address</i>&gt;</b>                                                                                                                                                                     |
| Release Information      | Command introduced in Junos OS Release 13.3.                                                                                                                                                                                                                                                     |
| Description              | Clear current statistics accumulated by the ANCP agent for all ANCP neighbors or the specified neighbor.                                                                                                                                                                                         |
| Options                  | <b>none</b> —Clear all ANCP statistics.<br><br><b>ip-address <i>ip-address</i></b> —(Optional) Clear statistics for the ANCP neighbor specified by the IP address.<br><br><b>system-name <i>mac-address</i></b> —(Optional) Clear statistics for the ANCP neighbor specified by the MAC address. |
| Required Privilege Level | clear                                                                                                                                                                                                                                                                                            |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">show ancp neighbor on page 1353</a></li></ul>                                                                                                                                                                                                |
| List of Sample Output    | <a href="#">clear ancp statistics on page 1342</a><br><a href="#">show ancp neighbor on page 1342</a>                                                                                                                                                                                            |
| Output Fields            | When you enter this command, you are provided no feedback on the status of your request. You can enter the <b>show ancp neighbor</b> command before and after clearing the ANCP neighbor statistics to verify the clear operation.                                                               |

## Sample Output

### clear ancp statistics

```
user@host> clear ancp statistics
```

### show ancp neighbor

The following sample output displays statistics for an ANCP neighbor before and after the **clear ancp statistics** command was issued.

```
user@host> show ancp neighbor ip-address 192.168.10.1 detail
Neighbor Information
 IP Address : 192.168.10.1
 System Name : 00:00:64:1b:01:02
 Up Time : 38
 TCP Port : 64959
 State : Established
 Subscriber Count : 7
 Capabilities : Topology Discovery
 System Instance : 11
```



```

Peer Instance : 1
Adjacency Timer (in 100ms) : 50
Peer Adjacency Timer (in 100ms) : 100
Partition Type : 0
Partition Flag : 1
Partition Identifier : 0
Dead Timer : 22
Received Syn Count : 47
Received Synack Count : 48
Received Rstack Count : 2
Received Ack Count : 12
Received Port Up Count : 8
Received Port Down Count : 2
Received Other Count : 0
Sent Syn Count : 48
Sent Synack Count : 47
Sent Rstack Count : 1
Sent Ack Count : 12
Max Discovery Limit Exceed Count : 0

```

```
user@host> clear ancp statistics ip-address 192.168.10.1
```

```
user@host> show ancp neighbor ip-address 192.168.10.1 detail
```

#### Neighbor Information

```

IP Address : 192.168.10.1
System Name : 00:00:64:1b:01:02
Up Time : 38
TCP Port : 64959
State : Established
Subscriber Count : 7
Capabilities : Topology Discovery
System Instance : 11
Peer Instance : 1
Adjacency Timer (in 100ms) : 50
Peer Adjacency Timer (in 100ms) : 100
Partition Type : 0
Partition Flag : 1
Partition Identifier : 0
Dead Timer : 22
Received Syn Count : 0
Received Synack Count : 0
Received Rstack Count : 0
Received Ack Count : 0
Received Port Up Count : 0
Received Port Down Count : 0
Received Other Count : 0
Sent Syn Count : 0
Sent Synack Count : 0
Sent Rstack Count : 0
Sent Ack Count : 0
Max Discovery Limit Exceed Count : 0

```

## clear ancp subscriber

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear ancp subscriber</code><br><code>&lt;identifier <i>identifier-string</i>&gt;</code><br><code>&lt;ip-address <i>ip-address</i>&gt;</code><br><code>system-name <i>mac-address</i>&gt;</code>                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Clear the ANCP agent connection with all ANCP subscribers or with the specified ANCP subscriber. This command deletes information for the subscribers, causing the adjusted traffic rate to revert to the configured rate for the subscriber interface, but otherwise has no affect on ANCP neighbors.                                                                                                                                 |
| <b>Options</b>                  | <p><b>none</b>—Clear all ANCP subscribers.</p> <p><b>identifier <i>identifier-string</i></b>—(Optional) Clear the ANCP subscriber identified by the access loop ID.</p> <p><b>ip-address <i>ip-address</i></b>—(Optional) Clear all ANCP subscribers on the neighbor specified by the IP address.</p> <p><b>system-name <i>mac-address</i></b>—(Optional) Clear all ANCP subscribers on the neighbor specified by the MAC address.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ancp subscriber on page 1366</a></li> </ul>                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show ancp subscriber brief on page 1344</a><br><a href="#">clear ancp subscriber on page 1345</a>                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | When you enter this command, you are provided no feedback on the status of your request. You can enter the <b>show ancp subscriber</b> command before and after clearing the ANCP neighbors to verify the clear operation.                                                                                                                                                                                                             |

## Sample Output

### show ancp subscriber brief

```

user@host> show ancp subscriber brief
Loop Identifier Type Interface Rate Neighbor
 Kbps
port-1-10 VDSL2 set-ge-10410 64 10.10.10.2
port-1-11 VDSL2 set-ge-10411 64 11.11.11.2
port-2-10 VDSL2 ge-1/0/4.12 64 10.12.12.2
port-2-10 VDSL2 ge-1/0/4.12 64 10.12.12.3
port-2-11 VDSL2 ge-1/0/4.13 64 10.13.13.2

user@host> clear ancp subscriber identifier port-2-10

```

```
user@host> show ancp subscriber brief
```

| Loop Identifier | Type  | Interface    | Rate<br>Kbps | Neighbor   |
|-----------------|-------|--------------|--------------|------------|
| port-1-10       | VDSL2 | set-ge-10410 | 64           | 10.10.10.2 |
| port-1-11       | VDSL2 | set-ge-10411 | 64           | 11.11.11.2 |
| port-2-11       | VDSL2 | ge-1/0/4.13  | 64           | 10.13.13.2 |

#### clear ancp subscriber

```
user@host> clear ancp subscriber
```

## request ancp oam interface

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>request ancp oam interface</b><br><i>(interface-name   interface-set set-name)</i><br><count <i>count</i> ><br><timeout <i>duration</i> >                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Trigger the access node to run a loopback test on the local loop between the access node and the customer premises equipment. You must specify either an ANCP interface or an ANCP interface set. The access node responds to the NAS with the results of the test.                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>interface-name</b>—Name of the ANCP interface on whose local loop the loopback test is run.</p> <p><b>interface-set set-name</b>—Name of the ANCP interface set on whose local loop the loopback test is run.</p> <p><b>count count</b>—(Optional) Number of times a loopback message is sent on the local loop. Range: 1 through 32. Default: 1.</p> <p><b>timeout duration</b>—(Optional) Period of time in seconds that the NAS waits for a response to the OAM request. Range: 0 through 255. Default: 5.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Triggering ANCP OAM to Test the Local Loop</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">request ancp oam interface on page 1346</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request, including the result of the test, the response code, and the response string returned with the OAM response in the event of failure, an error code is displayed.                                                                                                                                                                                                                                                                  |

## Sample Output

### request ancp oam interface

```
user@host> request ancp oam interface ge-1/0/4.12 count 5 timeout 40
request succeeded
0x503 : DSL line status showtime
DEFAULT RESPONSE
```

## request ancp oam neighbor

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>request ancp oam neighbor</code><br>( <code>ip-address <i>ip-address</i>   system-name <i>neighbor-name</i></code> )<br><code>subscriber <i>identifier-string</i></code><br>< <code>count <i>count</i></code> ><br>< <code>timeout <i>duration</i></code> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Trigger the access node to run a loopback test on the local loop between the access node and the customer premises equipment. You must specify both the access node and the subscriber. The access node responds to the NAS with the results of the test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><code>ip-address <i>ip-address</i></code>—IP address that specifies the access node on whose local loop the loopback test is run.</p> <p><code>system-name <i>neighbor-name</i></code>—System name that specifies the access node on whose local loop the loopback test is run.</p> <p><code>subscriber <i>identifier-string</i></code>—Access identifier that specifies the subscriber on whose local loop the loopback test is run.</p> <p><code>count <i>count</i></code>—(Optional) Number of times a loopback message is sent on the local loop. Range: 1 through 32. Default: 1.</p> <p><code>timeout <i>duration</i></code>—(Optional) Period of time in seconds that the NAS waits for a response to the OAM request. Range: 0 through 255. Default: 5.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Triggering ANCP OAM to Test the Local Loop</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">request ancp oam subscriber on page 1347</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request, including the result of the test, the response code, and the response string returned with the OAM response in the event of failure, an error code is displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### request ancp oam subscriber

```
user@host> request ancp oam neighbor 10.10.10.1 subscriber "dslam port-1-11"
request succeeded
0x503 : DSL line status showtime
DEFAULT RESPONSE
```

## show ancp cos

|                                 |                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show ancp cos</b><br><b>&lt;identifier <i>identifier</i>&gt;</b><br><b>&lt;last-update&gt;</b><br><b>&lt;pending-update&gt;</b>                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Display information about the CoS state for subscriber traffic.                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <b>identifier <i>identifier</i></b> —(Optional) Display information about the local loops for the specified access identifier.<br><br><b>last-update</b> —(Optional) Display the most recently updated CoS information.<br><br><b>pending-update</b> —(Optional) Display the pending update of CoS information. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ancp neighbor on page 1353</a></li> <li>• <a href="#">show ancp statistics on page 1361</a></li> <li>• <a href="#">show ancp subscriber on page 1366</a></li> </ul>                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show ancp cos on page 1350</a><br><a href="#">show ancp cos last-update on page 1351</a><br><a href="#">show ancp cos pending-update on page 1351</a>                                                                                                                                               |
| <b>Output Fields</b>            | Table 68 on page 1348 lists the output fields for the <b>show ancp cos</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                     |

**Table 68: show ancp cos Output Fields**

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                             |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Per-DSL CoS adjustment</b> | Adjustment values applied by the ANCP agent to the actual downstream rates and frame overhead for frame-mode DSL types. The agent then reports the adjusted rates to CoS to establish a shaping rate for the CoS node that corresponds to the subscriber access line.                                         |
| <b>QoS Adjust Flag</b>        | State of QoS adjust: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—The ANCP agent is enabled to adjust the actual downstream data rates and frame overhead and report the adjusted values to CoS.</li> <li>• <b>FALSE</b>—The ANCP agent is not enabled to adjust and report values to CoS.</li> </ul> |
| <b>SDSL overhead adjusted</b> | Percentage by which the actual SDSL downstream rate is adjusted before reporting it to CoS.                                                                                                                                                                                                                   |

Table 68: show ancp cos Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                               |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SDSL bytes</b>                       | Number of bytes by which the actual SDSL downstream frame overhead is adjusted before reporting it to CoS.                                                                                                                                                                      |
| <b>VDSL overhead adjusted</b>           | Percentage by which the actual VDSL downstream rate is adjusted before reporting it to CoS.                                                                                                                                                                                     |
| <b>VDSL bytes</b>                       | Number of bytes by which the actual VDSL downstream frame overhead is adjusted before reporting it to CoS.                                                                                                                                                                      |
| <b>VDSL2 overhead adjusted</b>          | Percentage by which the actual VDSL2 downstream rate is adjusted before reporting it to CoS.                                                                                                                                                                                    |
| <b>VDSL2 bytes</b>                      | Number of bytes by which the actual VDSL2 downstream frame overhead is adjusted before reporting it to CoS.                                                                                                                                                                     |
| <b>Per-DSL adjustment for reporting</b> | Adjustment values applied by the ANCP agent to the actual downstream rates for individual DSL types to account for traffic overhead. The agent then reports the adjusted rates to AAA.                                                                                          |
| <b>ADSL adjustment factor</b>           | Percentage by which the actual ADSL downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                     |
| <b>ADSL2 adjustment factor</b>          | Percentage by which the actual ADSL2 downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                    |
| <b>ADSL2+ adjustment factor</b>         | Percentage by which the actual ADSL2+ downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                   |
| <b>VDSL adjustment factor</b>           | Percentage by which the actual VDSL downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                     |
| <b>VDSL2 adjustment factor</b>          | Percentage by which the actual VDSL2 downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                    |
| <b>SDSL adjustment factor</b>           | Percentage by which the actual SDSL downstream rate is adjusted before reporting it to AAA.                                                                                                                                                                                     |
| <b>Keepalive Timer</b>                  | Interval between the keepalive messages that the ANCP agent sends to CoS.                                                                                                                                                                                                       |
| <b>Cos State</b>                        | State of the interaction between the ANCP agent and CoS: <ul style="list-style-type: none"> <li>• ANCPD_COS_CONNECT_NEEDED</li> <li>• ANCPD_COS_CONNECT_PENDING</li> <li>• ANCPD_COS_CONNECT_DONE</li> <li>• ANCPD_COS_SESSION_SENT</li> <li>• ANCPD_COS_WRITE_READY</li> </ul> |
| <b>Connect Time</b>                     | Time at which the ANCP agent connected to CoS; useful for debugging.                                                                                                                                                                                                            |

Table 68: show ancp cos Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                      |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Session Time          | Time at which the ANCP agent sent a session connect message to CoS; useful for debugging.                                                                              |
| Routing Instance Time | Time at which the ANCP agent sent the routing instance to CoS; useful for debugging.                                                                                   |
| Keepalive Time        | Time at which the last keepalive message was sent.                                                                                                                     |
| Update Time           | Time at which the shaping rate was last updated.                                                                                                                       |
| Type                  | Subscriber access type: <b>ifl</b> indicates that a single VLAN carries subscriber traffic and <b>iflset</b> indicates that a set of VLANs carries subscriber traffic. |
| Name                  | System-wide name of the particular subscriber access.                                                                                                                  |
| Index                 | Access identifier.                                                                                                                                                     |
| Pending Update        | Actual downstream data rate to be applied next to this local loop, in Kbps.                                                                                            |
| Last Update           | Adjusted downstream data rate last reported to CoS by the ANCP agent for this local loop, in Kbps.                                                                     |

## Sample Output

### show ancp cos

```

user@host> show ancp cos

Per-DSL CoS adjustment:
 Qos Adjust Flag: TRUE
 VDSL overhead adjusted: 90
 VDSL bytes: 20
 VDSL2 overhead adjusted: 95
 VDSL2 bytes: -20
 SDSL overhead adjusted: 85
 SDSL bytes: 30

Per-DSL adjustment for reporting:
 ADSL adjustment factor: 100
 ADSL2 adjustment factor: 100
 ADSL2+ adjustment factor: 100
 VDSL adjustment factor: 100
 VDSL2 adjustment factor: 100
 SDSL adjustment factor: 100

Keepalive Timer: 45 secs
State: WRITE_READY
Connect Time: Fri May 2 12:08:49 2014
Session Time: Fri May 2 12:18:52 2014
Routing Instance Time: Fri May 2 12:18:53 2014
Keepalive Time: Fri May 2 13:44:14 2014
Update Time: Fri May 2 13:02:55 2014

```



| Type   | Name                         | Index | Pending Update | Last Update |
|--------|------------------------------|-------|----------------|-------------|
| iflset | aci-1004-ge-2/0/0.1073741834 | 4     | None           | 36000 Kbps  |

### show ancp cos last-update

```

Per-DSL CoS adjustment:
 Qos Adjust Flag: TRUE
 VDSL overhead adjusted: 90
 VDSL bytes: 20
 VDSL2 overhead adjusted: 95
 VDSL2 bytes: -20
 SDSL overhead adjusted: 85
 SDSL bytes: 30

Per-DSL adjustment for reporting:
 ADSL adjustment factor: 100
 ADSL2 adjustment factor: 100
 ADSL2+ adjustment factor:100
 VDSL adjustment factor: 100
 VDSL2 adjustment factor: 100
 SDSL adjustment factor: 100

Keepalive Timer: 45 secs
State: WRITE_READY
Connect Time: Fri May 2 12:08:49 2014
Session Time: Fri May 2 12:18:52 2014
Routing Instance Time: Fri May 2 12:18:53 2014
Keepalive Time: Fri May 2 13:44:34 2014
Update Time: Fri May 2 13:02:55 2014

```

| Type   | Name                         | Index | Pending Update | Last Update |
|--------|------------------------------|-------|----------------|-------------|
| iflset | aci-1004-ge-2/0/0.1073741834 | 4     | None           | 36000 Kbps  |

### show ancp cos pending-update

```

user@host> show ancp cos pending-update
Per-DSL CoS adjustment:
 Qos Adjust Flag: TRUE
 VDSL overhead adjusted: 90
 VDSL bytes: 20
 VDSL2 overhead adjusted: 95
 VDSL2 bytes: -20
 SDSL overhead adjusted: 85
 SDSL bytes: 30

Per-DSL adjustment for reporting:
 ADSL adjustment factor: 100
 ADSL2 adjustment factor: 100
 ADSL2+ adjustment factor:100
 VDSL adjustment factor: 100
 VDSL2 adjustment factor: 100
 SDSL adjustment factor: 100

Keepalive Timer: 45 secs
State: WRITE_READY
Connect Time: Fri May 2 12:08:49 2014
Session Time: Fri May 2 12:18:52 2014
Routing Instance Time: Fri May 2 12:18:53 2014

```

Keepalive Time: Fri May 2 13:44:34 2014  
Update Time: Fri May 2 13:02:55 2014

show ancp neighbor

|                          |                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | show ancp neighbor<br><brief   detail><br><ip-address <i>ip-address</i> ><br><system-name <i>mac-address</i> >                                                                                                                                                                          |
| Release Information      | Command introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                             |
| Description              | Display information about all ANCP neighbors or the specified ANCP neighbor, regardless of operational state.                                                                                                                                                                           |
| Options                  | <b>brief   detail</b> —(Optional) Display the specified level of detail.<br><br><b>ip-address <i>ip-address</i></b> —(Optional) IP address of the ANCP neighbor (access node).<br><br><b>system-name <i>mac-address</i></b> —(Optional) MAC address of the ANCP neighbor (access node). |
| Required Privilege Level | view                                                                                                                                                                                                                                                                                    |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">show ancp cos on page 1348</a></li><li>• <a href="#">show ancp subscriber on page 1366</a></li></ul>                                                                                                                                |
| List of Sample Output    | <a href="#">show ancp neighbor on page 1356</a><br><a href="#">show ancp neighbor detail on page 1356</a><br><a href="#">show ancp neighbor ip-address on page 1358</a><br><a href="#">show ancp neighbor system-name on page 1359</a>                                                  |
| Output Fields            | <a href="#">Table 69 on page 1353</a> lists the output fields for the <b>show ancp neighbor</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                        |

Table 69: show ancp neighbor Output Fields

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Version    | Version of the ANCP implementation: <ul style="list-style-type: none"><li>• <b>0x31</b>—General Switch Management Protocol (GSMP) version 3, sub-version 1; ANCP version before <i>RFC 6320, Protocol for Access Node Control Mechanism in Broadband Networks</i>.</li><li>• <b>0x32</b>—ANCP version 1, defined in <i>RFC 6320, Protocol for Access Node Control Mechanism in Broadband Networks</i>.</li></ul> | <b>brief detail none</b> |
| IP Address | IP address of the ANCP neighbor.                                                                                                                                                                                                                                                                                                                                                                                 | <b>brief detail none</b> |
| PartId     | Number that associates the ANCP message with a specific partition.                                                                                                                                                                                                                                                                                                                                               | <b>brief none</b>        |

Table 69: show ancp neighbor Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>State</b>            | Operational state of the ANCP adjacency: <ul style="list-style-type: none"> <li>Configured—The neighbor has been configured, but has never been in the <b>Established</b> state. An asterisk (*) is prefixed to the neighbor entry for this state.</li> <li>Establishing—Adjacency negotiations are in progress for the neighbor. An asterisk (*) is prefixed to the neighbor entry for this state. This state is rarely seen because the adjacency is established so quickly.</li> <li><b>Established</b>—Adjacency negotiations have succeeded for the neighbor and an ANCP session has been established.</li> <li>Not Estblshed—Not Established; adjacency negotiations are ready to begin. Indicates that this neighbor previously had been in the <b>Established</b> state; that is, it has lost a previously established adjacency. An asterisk (*) is prefixed to the neighbor entry for this state.</li> </ul> | All levels               |
| <b>Time</b>             | How long the adjacency has been up in one of the following formats: <ul style="list-style-type: none"> <li><i>nwndnh</i>—number of weeks, days, and hours</li> <li><i>nd hh:mm:ss</i>—number of days, hours, minutes, and seconds</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>brief detail none</b> |
| <b>Subscriber Count</b> | Number of subscribers associated with the ANCP neighbor (access local loop).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>brief none</b>        |
| <b>Capabilities</b>     | Negotiated ANCP capability: <ul style="list-style-type: none"> <li><b>Topo</b>—Topology discovery.</li> <li><b>OAM</b>—Performance of local Operations Administration Maintenance (OAM) procedures on an access loop controlled by the router.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels               |
| <b>System Name</b>      | MAC address of the ANCP neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail</b>            |
| <b>TCP Port</b>         | TCP port on which ANCP messages are exchanged.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail</b>            |
| <b>System Instance</b>  | Number identifying the ANCP link instance from the edge device's perspective.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail</b>            |
| <b>Peer Instance</b>    | Number identifying the ANCP instance from the access node's perspective. This number is unique and changes when the node or link comes back up after going down.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail</b>            |
| <b>Timer</b>            | Adjacency timer value advertised by the ANCP peer in 100 ms increments; the interval between ANCP ACK messages. This value remains constant for the duration of an ANCP session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail</b>            |
| <b>Partition Type</b>   | Number that identifies whether partitions are used and how the ID is negotiated: <ul style="list-style-type: none"> <li><b>0</b>—No partition.</li> <li><b>1</b>—Fixed partition requested.</li> <li><b>2</b>—Fixed partition assigned.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail</b>            |
| <b>Partition Flag</b>   | Number that specifies the type of partition requested: 1 (new adjacency) or 2 (recovered adjacency).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail</b>            |

Table 69: show ancp neighbor Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                 | Level of Output |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Partition Identifier</b>            | Number that associates the ANCP message with a specific partition.                                                                                                                                                                                                                                                | <b>detail</b>   |
| <b>Partition Adjacencies</b>           | Number of adjacencies that share the partition.                                                                                                                                                                                                                                                                   | <b>detail</b>   |
| <b>Dead Timer</b>                      | Remaining period that the edge device waits for adjacency packets from a neighbor before declaring the neighbor to be down. The maximum dead time value is three times the configured adjacency timer value. This field displays the current value based on the time that the last adjacency packet was received. | <b>detail</b>   |
| <b>Received Syn Count</b>              | Number of synchronization messages received from neighbors to maintain adjacencies.                                                                                                                                                                                                                               | <b>detail</b>   |
| <b>Received Synack Count</b>           | Number of synchronization acknowledgment messages received from neighbors in response to the node's synchronization messages.                                                                                                                                                                                     | <b>detail</b>   |
| <b>Received Rstack Count</b>           | Number of messages received from neighbors indicating that the link to the neighbor needs to be reset.                                                                                                                                                                                                            | <b>detail</b>   |
| <b>Received Ack Count</b>              | Number of acknowledgment messages periodically received from neighbors after an adjacency has been established.                                                                                                                                                                                                   | <b>detail</b>   |
| <b>Received Port Up Count</b>          | Number of status messages received from neighbors indicating that a port has transitioned to the up state.                                                                                                                                                                                                        | <b>detail</b>   |
| <b>Received Port Down Count</b>        | Number of status messages received from neighbors indicating that a port has transitioned to the down state.                                                                                                                                                                                                      | <b>detail</b>   |
| <b>Received Generic Resp Count</b>     | Number of generic response messages received from neighbors.                                                                                                                                                                                                                                                      | <b>detail</b>   |
| <b>Received Adjacency Update Count</b> | Number of adjacency update messages received from neighbors.                                                                                                                                                                                                                                                      | <b>detail</b>   |
| <b>Received OAM Count</b>              | Number of OAM responses received from neighbors in reply to <b>request</b> commands.                                                                                                                                                                                                                              | <b>detail</b>   |
| <b>Received Other Count</b>            | Number of all other ANCP message packets received from neighbors that do not fit into one of the other categories.                                                                                                                                                                                                | <b>detail</b>   |
| <b>Sent Syn Count</b>                  | Number of synchronization messages sent to neighbors to maintain adjacencies.                                                                                                                                                                                                                                     | <b>detail</b>   |
| <b>Sent Synack Count</b>               | Number of synchronization acknowledgment messages sent to neighbors in response to the their synchronization messages.                                                                                                                                                                                            | <b>detail</b>   |
| <b>Sent Rstack Count</b>               | Number of messages sent to neighbors indicating that the link to the neighbor needs to be reset.                                                                                                                                                                                                                  | <b>detail</b>   |
| <b>Sent Ack Count</b>                  | Number of acknowledgment messages periodically sent to neighbors after an adjacency has been established.                                                                                                                                                                                                         | <b>detail</b>   |

Table 69: show ancp neighbor Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Sent Generic Resp Count</b>          | Number of generic response messages sent to neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail</b>   |
| <b>Sent OAM Count</b>                   | Number of OAM <b>request</b> commands sent to neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail</b>   |
| <b>Max Discovery Limit Exceed Count</b> | Number of times that the maximum number of discovery table entries accepted from the neighbor has been exceeded.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail</b>   |
| <b>Result Codes</b>                     | <p>Number of generic response messages sent to neighbors that include each of the following result codes:</p> <ul style="list-style-type: none"> <li>• <b>Invalid Request Message Count</b>—A properly formed request message violated the protocol because of timing (such as a race condition) or direction of transmission.</li> <li>• <b>Specified Port(s) Down Count</b>—One or more of the specified ports are down because of a state mismatch between the router and an ANCP control application.</li> <li>• <b>Out of Resources Count</b>—ANCP is out of resources, probably not related to the access lines. This result code is sent only by an access node.</li> <li>• <b>Request Msg Not Implemented Count</b>—</li> <li>• <b>Malformed Msg Count</b>—Message is malformed because it was corrupted in transit or there was an implementation error at either end of the connection.</li> <li>• <b>TLV Missing Count</b>—One or more mandatory TLVs was missing from a request.</li> <li>• <b>Invalid TLV Contents Count</b>—The contents of one or more TLVs in the request do not match its required specification.</li> <li>• <b>Non-Existent Port(s) Count</b>—One or more of the ports specified in a request do not exist, possibly because of a configuration mismatch between the access node and the router or AAA.</li> </ul> | <b>detail</b>   |

## Sample Output

### show ancp neighbor

```

user@host> show ancp neighbor
 Version IP Address PartID State Time Subscriber
Capabilities
 0x31 10.0.1.3 0 Established 11:24 2 Topo
 0x31 10.0.1.5 0 Not Estblshd 2:45 2 Topo
* 0x0 100.0.0.2 0 Establishing 0 0
* 0x0 192.0.1.0 0 Configured 0 0
* 0x0 192.0.22.1 0 Configured 0 0

```

### show ancp neighbor detail

```

user@host> show ancp neighbor detail
Neighbor Information
 Version : 0x31
 IP Address : 192.85.1.5
 System Name : 00:10:94:00:00:01
 Up Time : 26
 TCP Port : 32666

```

```

State : Established
Subscriber Count : 4
Capabilities : Topo
System Instance : 2
Peer Instance : 20
Adjacency Timer (in 100ms) : 100
Peer Adjacency Timer (in 100ms) : 100
Partition Type : 0
Partition Flag : 1
Partition Identifier : 0
Partition Adjacencies : 0
Dead Timer : 23
Received Syn Count : 1
Received Synack Count : 1
Received Rstack Count : 0
Received Ack Count : 4
Received Port Up Count : 10
Received Port Down Count : 0
Received Generic Resp Count : 0
Received Adjacency Update Count : 0
Received OAM Count : 0
Received Other Count : 0
Sent Syn Count : 1
Sent Synack Count : 2
Sent Rstack Count : 0
Sent Ack Count : 3
Sent Generic Resp Count : 0
Sent OAM Count : 0
Max Discovery Limit Exceed Count : 0
Result Codes:
Invalid Request Message Count : 0 Received Sent
Specified Port(s) Down Count : 0 0
Out of Resources Count : 0 0
Request Msg Not Implemented Count: 0 0
Malformed Msg Count : 0 0
TLV Missing Count : 0 0
Invalid TLV Contents Count : 0 0
Non-Existent Port(s) Count : 0 0

Version : 0x32
IP Address : 192.168.9.1
System Name : 00:00:64:1c:01:02
Up Time : 36
TCP Port : 61408
State : Not Established
Subscriber Count : 1
Capabilities : Topology Discovery
System Instance : 12
Peer Instance : 1
Adjacency Timer (in 100ms) : 50
Peer Adjacency Timer (in 100ms) : 100
Partition Type : 0
Partition Flag : 1
Partition Identifier : 0
Partition Adjacencies : 0
Dead Timer : 23
Received Syn Count : 24
Received Synack Count : 20
Received Rstack Count : 2
Received Ack Count : 9

```

```

Received Port Up Count : 5
Received Port Down Count : 0
Received Generic Resp Count : 0
Received Adjacency Update Count : 0
Received OAM Responses Count : 2
Received Other Count : 0
Sent Syn Count : 20
Sent Synack Count : 24
Sent Rstack Count : 1
Sent Generic Resp Count : 0
Sent Ack Count : 9
Sent OAM Requests Count : 4
Max Discovery Limit Exceed Count : 0
Result Codes:
Invalid Request Message Count : 0
Specified Port(s) Down Count : 0
Out of Resources Count : 0
Request Msg Not Implemented Count: 0
Malformed Msg Count : 0
TLV Missing Count : 0
Invalid TLV Contents Count : 0
Non-Existent Port(s) Count : 0

```

### show ancp neighbor ip-address

```
user@host> show ancp neighbor ip-address 192.85.1.5
```

#### Neighbor Information

```

Version : 0x32
IP Address : 192.85.1.5
System Name : ba:ad:be:ef:10:10
Up Time : 26
TCP Port : 32666
State : Established
Subscriber Count : 4
Capabilities : Topo
System Instance : 2
Peer Instance : 20
Adjacency Timer (in 100ms) : 100
Peer Adjacency Timer (in 100ms) : 100
Partition Type : 0
Partition Flag : 1
Partition Identifier : 0
Partition Adjacencies : 0
Dead Timer : 23
Received Syn Count : 1
Received Synack Count : 1
Received Rstack Count : 0
Received Ack Count : 4
Received Port Up Count : 10
Received Port Down Count : 0
Received Generic Resp Count : 0
Received Adjacency Update Count : 0
Received OAM Count : 0
Received Other Count : 0
Sent Syn Count : 1
Sent Synack Count : 2
Sent Rstack Count : 0
Sent Ack Count : 3
Sent Generic Resp Count : 0
Sent OAM Count : 0

```



|                                   |          |      |
|-----------------------------------|----------|------|
| Max Discovery Limit Exceed Count  | : 0      |      |
| Result Codes:                     | Received | Sent |
| Invalid Request Message Count     | : 0      | 0    |
| Specified Port(s) Down Count      | : 0      | 0    |
| Out of Resources Count            | : 0      | 0    |
| Request Msg Not Implemented Count | : 0      | 0    |
| Malformed Msg Count               | : 0      | 0    |
| TLV Missing Count                 | : 0      | 0    |
| Invalid TLV Contents Count        | : 0      | 0    |
| Non-Existent Port(s) Count        | : 0      | 0    |

### show ancp neighbor system-name

user@host> show ancp neighbor ba:ad:be:ef:10:10 detail

#### Neighbor Information

|                                   |                           |      |
|-----------------------------------|---------------------------|------|
| Version                           | : 0x31                    |      |
| IP Address                        | : 10.100.0.1              |      |
| System Name                       | : 00:00:64:1b:01:02       |      |
| Up Time                           | : 19                      |      |
| TCP Port                          | : 1028                    |      |
| State                             | : Established             |      |
| Subscriber Count                  | : 2                       |      |
| Capabilities                      | : Topology Discovery, OAM |      |
| System Instance                   | : 1                       |      |
| Peer Instance                     | : 10                      |      |
| Adjacency Timer (in 100ms)        | : 100                     |      |
| Peer Adjacency Timer (in 100ms)   | : 250                     |      |
| Partition Type                    | : 0                       |      |
| Partition Flag                    | : 1                       |      |
| Partition Identifier              | : 0                       |      |
| Partition Adjacencies             | : 0                       |      |
| Dead Timer                        | : 55                      |      |
| Received Syn Count                | : 1                       |      |
| Received Synack Count             | : 1                       |      |
| Received Rstack Count             | : 0                       |      |
| Received Ack Count                | : 1                       |      |
| Received Port Up Count            | : 34                      |      |
| Received Port Down Count          | : 0                       |      |
| Received Generic Resp Count       | : 0                       |      |
| Received Adjacency Update Count   | : 0                       |      |
| Received OAM Responses Count      | : 2                       |      |
| Received Other Count              | : 0                       |      |
| Sent Syn Count                    | : 1                       |      |
| Sent Synack Count                 | : 1                       |      |
| Sent Rstack Count                 | : 0                       |      |
| Sent Ack Count                    | : 3                       |      |
| Sent Generic Resp Count           | : 0                       |      |
| Sent OAM Requests Count           | : 4                       |      |
| Max Discovery Limit Exceed Count  | : 3                       |      |
| Result Codes:                     | Received                  | Sent |
| Invalid Request Message Count     | : 0                       | 0    |
| Specified Port(s) Down Count      | : 0                       | 0    |
| Out of Resources Count            | : 0                       | 0    |
| Request Msg Not Implemented Count | : 0                       | 0    |
| Malformed Msg Count               | : 0                       | 0    |
| TLV Missing Count                 | : 0                       | 0    |
| Invalid TLV Contents Count        | : 0                       | 0    |
| Non-Existent Port(s) Count        | : 0                       | 0    |



## show ancp statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show ancp statistics</code><br><code>&lt;ip-address <i>ip-address</i>&gt;</code><br><code>&lt;system-name <i>mac-address</i>&gt;</code>                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced in Junos OS Release 13.3.                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display statistics for all ANCP neighbors (access nodes) or the specified ANCP neighbor.                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>none</b>—Display statistics for all ANCP neighbors, including global statistics not show for individual neighbors.</p> <p><b>ip-address <i>ip-address</i></b>—(Optional) Display statistics for only the neighbor with the specified IP address.</p> <p><b>system-name <i>mac-address</i></b>—(Optional) Display statistics for only the neighbor with the specified MAC address.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ancp cos on page 1348</a></li> <li>• <a href="#">show ancp neighbor on page 1353</a></li> <li>• <a href="#">show ancp subscriber on page 1366</a></li> </ul>                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show ancp statistics on page 1363</a><br><a href="#">show ancp statistics ip-address on page 1364</a><br><a href="#">show ancp statistics system-name on page 1364</a>                                                                                                                                                                                                          |
| <b>Output Fields</b>            | Table 70 on page 1361 lists the output fields for the <b>show ancp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                          |

**Table 70: show ancp statistics Output Fields**

| Field Name            | Field Description                                                                                                                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of neighbors   | Total count of ANCP neighbors.                                                                                                                                                                                            |
| Number of subscribers | Total count of ANCP subscribers.                                                                                                                                                                                          |
| Accept Count          | Number of neighbor TCP/IP sessions accepted on listener socket.                                                                                                                                                           |
| Accept Fail Count     | Number of neighbor TCP/IP sessions that failed due to one of the following causes: session already exists, maximum number of ANCP connections exceeded, creation of session or neighbor failed, or protocol start failed. |

Table 70: show ancp statistics Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| No Config Accept Deny Count     | Number of neighbor TCP/IP sessions that failed because the neighbor was not configured.                                       |
| Received Syn Count              | Number of synchronization messages received from neighbors to maintain adjacencies.                                           |
| Received Synack Count           | Number of synchronization acknowledgment messages received from neighbors in response to the node's synchronization messages. |
| Received Rstack Count           | Number of messages received from neighbors indicating that the link to the neighbor needs to be reset.                        |
| Received Ack Count              | Number of acknowledgment messages periodically received from neighbors after an adjacency has been established.               |
| Received Port Up Count          | Number of status messages received from neighbors indicating that a port has transitioned to the up state.                    |
| Received Port Down Count        | Number of status messages received from neighbors indicating that a port has transitioned to the down state.                  |
| Received Generic Resp Count     | Number of generic response messages received from neighbors.                                                                  |
| Received Adjacency Update Count | Number of adjacency update messages received from neighbors.                                                                  |
| Received OAM Count              | Number of OAM responses received from neighbors in reply to <b>request</b> commands.                                          |
| Received Other Count            | Number of all other ANCP message packets received from neighbors that do not fit into one of the other categories.            |
| Sent Syn Count                  | Number of synchronization messages sent to neighbors to maintain adjacencies.                                                 |
| Sent Synack Count               | Number of synchronization acknowledgment messages sent to neighbors in response to the their synchronization messages.        |
| Sent Rstack Count               | Number of messages sent to neighbors indicating that the link to the neighbor needs to be reset.                              |
| Sent Ack Count                  | Number of acknowledgment messages periodically sent to neighbors after an adjacency has been established.                     |
| Sent Generic Resp Count         | Number of generic response messages sent to neighbors.                                                                        |
| Sent OAM Count                  | Number of OAM <b>request</b> commands sent to neighbors.                                                                      |

Table 70: show ancp statistics Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Result Codes</b> | <p>Number of generic response messages sent to neighbors that include each of the following result codes:</p> <ul style="list-style-type: none"> <li>• <b>Invalid Request Message Count</b>—A properly formed request messages violated the protocol because of timing (such as a race condition) or direction of transmission.</li> <li>• <b>Specified Port(s) Down Count</b>—One or more of the specified ports are down because of a state mismatch between the router and an ANCP control application.</li> <li>• <b>Out of Resources Count</b>—the ANCP agent is out of resources, probably not related to the access lines. This result code is sent only by an access node.</li> <li>• <b>Request Msg Not Implemented Count</b>—</li> <li>• <b>Malformed Msg Count</b>—Message is malformed because it was corrupted in transit or there was an implementation error at either end of the connection.</li> <li>• <b>TLV Missing Count</b>—One or more mandatory TLVs was missing from a request.</li> <li>• <b>Invalid TLV Contents Count</b>—The contents of one or more TLVs in the request do not match its required specification.</li> <li>• <b>Non-Existent Port(s) Count</b>—One or more of the ports specified in a request do not exist, possibly because of a configuration mismatch between the access node and the router or AAA.</li> </ul> |

## Sample Output

show ancp statistics

```

user@host> show ancp statistics
Statistics
 Number of neighbors : 4
 Number of subscribers : 6
 Accept Count : 0
 Accept Fail Count : 0
 No Config Accept Deny Count : 0
 Received Syn Count : 2
 Received Synack Count : 1
 Received Rstack Count : 0
 Received Ack Count : 8
 Received Port Up Count : 7
 Received Port Down Count : 0
 Received Generic Resp Count : 0
 Received Adjacency Update Count : 0
 Received OAM Count : 0
 Received Other Count : 0
 Sent Syn Count : 1
 Sent Synack Count : 1
 Sent Rstack Count : 0
 Sent Ack Count : 17
 Sent Generic Resp Count : 0
 Sent OAM Count : 4
Result Codes:
 Invalid Request Message Count : 0
 Specified Port(s) Down Count : 0
 Out of Resources Count : 0
 Request Msg Not Implemented Count: 0
Received Sent

```

|                            |     |   |
|----------------------------|-----|---|
| Malformed Msg Count        | : 0 | 0 |
| TLV Missing Count          | : 0 | 0 |
| Invalid TLV Contents Count | : 0 | 0 |
| Non-Existent Port(s) Count | : 0 | 0 |

### show ancp statistics ip-address

```
user@host> show ancp statistics ip-address 10.0.0.1
Statistics
 Received Syn Count : 2
 Received Synack Count : 1
 Received Rstack Count : 0
 Received Ack Count : 8
 Received Port Up Count : 7
 Received Port Down Count : 0
 Received Generic Resp Count : 0
 Received Adjacency Update Count : 0
 Received OAM Count : 0
 Received Other Count : 0
 Sent Syn Count : 1
 Sent Synack Count : 1
 Sent Rstack Count : 0
 Sent Ack Count : 17
 Sent Generic Resp Count : 0
 Sent OAM Count : 4
Result Codes:
 Received Sent
Invalid Request Message Count : 0 0
Specified Port(s) Down Count : 0 0
Out of Resources Count : 0 0
Request Msg Not Implemented Count: 0 0
Malformed Msg Count : 0 0
TLV Missing Count : 0 0
Invalid TLV Contents Count : 0 0
Non-Existent Port(s) Count : 0 0
```

### show ancp statistics system-name

```
user@host> show ancp statistics system-name 00:00:64:1b:01:02
Statistics
 Received Syn Count : 2
 Received Synack Count : 1
 Received Rstack Count : 0
 Received Ack Count : 8
 Received Port Up Count : 7
 Received Port Down Count : 0
 Received Generic Resp Count : 0
 Received Adjacency Update Count : 0
 Received OAM Count : 0
 Received Other Count : 0
 Sent Syn Count : 1
 Sent Synack Count : 1
 Sent Rstack Count : 0
 Sent Ack Count : 17
 Sent Generic Resp Count : 0
 Sent OAM Count : 4
Result Codes:
 Received Sent
Invalid Request Message Count : 0 0
Specified Port(s) Down Count : 0 0
Out of Resources Count : 0 0
```

|                                    |     |   |
|------------------------------------|-----|---|
| Request Msg Not Implemented Count: | 0   | 0 |
| Malformed Msg Count                | : 0 | 0 |
| TLV Missing Count                  | : 0 | 0 |
| Invalid TLV Contents Count         | : 0 | 0 |
| Non-Existent Port(s) Count         | : 0 | 0 |

## show ancp subscriber

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show ancp subscriber</b><br><b>&lt;brief   detail&gt;</b><br><b>&lt;identifier <i>identifier</i>&gt;</b><br><b>&lt;neighbor <i>ip-address</i>&gt;</b>                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Display information about active subscribers regardless of the subscriber's operational state, for all subscribers (local access loops), the subscriber associated with the access line specified by an ACL, or the subscriber associated with the specified ANCP neighbor (access node).                                                                                                                 |
| <b>Options</b>                  | <p><b>brief   detail</b>—(Optional) Display the specified level of detail.</p> <p><b>identifier <i>identifier</i></b>—(Optional) Display information about the subscriber associated with the access line specified by the access identifier.</p> <p><b>neighbor <i>ip-address</i></b>—(Optional) Display information about the subscribers connected to the access node specified by the IP address.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear ancp subscriber on page 1344</a></li> <li>• <a href="#">show ancp cos on page 1348</a></li> <li>• <a href="#">show ancp neighbor on page 1353</a></li> </ul>                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show ancp subscriber on page 1369</a><br><a href="#">show ancp subscriber brief on page 1369</a><br><a href="#">show ancp subscriber detail on page 1369</a><br><a href="#">show ancp subscriber identifier identifier-string detail on page 1370</a>                                                                                                                                         |
| <b>Output Fields</b>            | <a href="#">Table 71 on page 1366</a> lists the output fields for the <b>show ancp subscriber</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                        |

**Table 71: show ancp subscriber Output Fields**

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output     |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Loop Identifier</b> | <p>Access loop identifier as sent by the access node and configured to map the subscriber to an interface.</p> <p>An asterisk (*) indicates that the information might be stale due to receiving a Port Down message with a DSL Line State of Idle.</p> <p>Two asterisks (**) indicate that the neighbor associated with the subscriber has lost its adjacency. In this case, the DSL Line State might be Established.</p> | <b>brief none</b>   |
| <b>DSL Line State</b>  | State of the DSL line: <b>Idle</b> , <b>Showtime</b> , or <b>Silent</b> .                                                                                                                                                                                                                                                                                                                                                  | <b>brief detail</b> |



Table 71: show ancp subscriber Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output          |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Type</b>                                | Type of digital subscriber line employed by the access node: <b>ADSL1</b> , <b>ADSL2</b> , <b>ADSL2+</b> , <b>VDSL1</b> , <b>VDSL2</b> , <b>SDSL</b> , or <b>UNKNOWN</b> .                                                                                                                                                                                                                                                         | <b>brief none</b>        |
| <b>Interface</b>                           | Name of the interface set or logical interface.                                                                                                                                                                                                                                                                                                                                                                                    | <b>brief detail none</b> |
| <b>Rate Kbps</b>                           | Actual downstream data rate for this local loop.                                                                                                                                                                                                                                                                                                                                                                                   | <b>brief none</b>        |
| <b>Neighbor</b>                            | IP address of ANCP neighbor (access node).                                                                                                                                                                                                                                                                                                                                                                                         | <b>brief none</b>        |
| <b>Access Loop Circuit Identifier</b>      | <p>Access loop circuit identifier as sent by the access node and configured to map the subscriber to an interface.</p> <p>An asterisk (*) indicates that the information might be stale due to receiving a Port Down message with a DSL Line State of Idle.</p> <p>Two asterisks (**) indicate that the neighbor associated with the subscriber has lost its adjacency. In this case, the DSL Line State might be Established.</p> | <b>detail</b>            |
| <b>Neighbor IP Address</b>                 | IP address of the ANCP neighbor (access node).                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail</b>            |
| <b>Aggregate Circuit Identifier Binary</b> | Binary identifier for the VLAN circuit ID.                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail</b>            |
| <b>DSL Type</b>                            | Type of digital subscriber line employed by the access node: <b>ADSL1</b> , <b>ADSL2</b> , <b>ADSL2+</b> , <b>VDSL1</b> , <b>VDSL2</b> , <b>SDSL</b> , or <b>UNKNOWN</b> .                                                                                                                                                                                                                                                         | <b>detail</b>            |
| <b>DSL Line Data Link</b>                  | Data link protocol employed on the access loop: <b>AAL5</b> or <b>Ethernet</b> .                                                                                                                                                                                                                                                                                                                                                   | <b>detail</b>            |
| <b>DSL Line Encapsulation</b>              | <p>Encapsulation type on the access loop, for Ethernet only:</p> <ul style="list-style-type: none"> <li>0—NA, type not conveyed</li> <li>1—Untagged Ethernet</li> <li>2—Single-tagged Ethernet</li> </ul>                                                                                                                                                                                                                          | <b>detail</b>            |
| <b>DSL Line Encapsulation Payload</b>      | <p>Payload carried across the access loop:</p> <ul style="list-style-type: none"> <li>0—NA, type not conveyed</li> <li>1—PPPoA LLC</li> <li>2—PPPoA null</li> <li>3—IPoA LLC</li> <li>4—IPoA null</li> <li>5—Ethernet over AAL5 LLC with FCS</li> <li>6—Ethernet over AAL5 LLC without FCS</li> <li>7—Ethernet over AAL5 null with FCS</li> <li>8—Ethernet over AAL5 null without FCS</li> </ul>                                   | <b>detail</b>            |
| <b>Interface Type</b>                      | Type of interface employed for subscriber traffic: <b>ifl</b> for a single VLAN or <b>interface-set</b> for a configured group of VLANs.                                                                                                                                                                                                                                                                                           | <b>detail</b>            |

Table 71: show ancpc subscriber Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                     | Level of Output |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------|
| <b>Actual Net Data Upstream</b>            | Actual upstream data rate for this local loop, in Kbps.                                               | <b>detail</b>   |
| <b>Actual Net Data Downstream</b>          | Actual downstream data rate for this local loop, in Kbps.                                             | <b>detail</b>   |
| <b>Minimum Net Data Upstream</b>           | Minimum upstream data rate desired by the operator for this local loop, in Kbps.                      | <b>detail</b>   |
| <b>Minimum Net Data Downstream</b>         | Minimum downstream data rate desired by the operator for this local loop, in Kbps.                    | <b>detail</b>   |
| <b>Maximum Net Data Upstream</b>           | Maximum upstream data rate desired by the operator for this local loop, in Kbps.                      | <b>detail</b>   |
| <b>Maximum Net Data Downstream</b>         | Maximum downstream data rate desired by the operator for this local loop, in Kbps.                    | <b>detail</b>   |
| <b>Attainable Net Data Upstream</b>        | Maximum attainable upstream data rate for this local loop, in Kbps.                                   | <b>detail</b>   |
| <b>Attainable Net Data Downstream</b>      | Maximum attainable downstream data rate for this local loop, in Kbps.                                 | <b>detail</b>   |
| <b>Minimum Low Power Data Downstream</b>   | Minimum downstream data rate desired by the operator for this local loop in low power state, in Kbps. | <b>detail</b>   |
| <b>Minimum Low Power Data Upstream</b>     | Minimum upstream data rate desired by the operator for this local loop in low power state, in Kbps.   | <b>detail</b>   |
| <b>Maximum Interleave Delay Downstream</b> | Maximum interleaving delay for downstream data, in milliseconds.                                      | <b>detail</b>   |
| <b>Maximum Interleave Delay Upstream</b>   | Maximum interleaving delay for upstream data, in milliseconds.                                        | <b>detail</b>   |
| <b>Actual Interleave Delay Downstream</b>  | Actual interleaving delay for downstream data, in milliseconds.                                       | <b>detail</b>   |
| <b>Actual Interleave Delay Upstream</b>    | Actual interleaving delay for upstream data, in milliseconds.                                         | <b>detail</b>   |

## Sample Output

### show ancp subscriber

```
user@host> show ancp subscriber
```

| Loop Identifier | DSL Line State | Type  | Interface | Rate Kbps | Neighbor |
|-----------------|----------------|-------|-----------|-----------|----------|
| **circuit 101   | Idle           | ADSL1 | ----      | 32        | 10.0.1.3 |
| **circuit 102   | Idle           | ADSL1 | ----      | 32        | 10.0.1.3 |
| circuit 301     | Showtime       | ADSL1 | ----      | 32        | 10.0.1.5 |
| circuit 302     | Showtime       | ADSL1 | ----      | 32        | 10.0.1.5 |

### show ancp subscriber brief

```
user@host> show ancp subscriber brief
```

| Loop Identifier | Type  | Interface    | Rate Kbps | Neighbor   |
|-----------------|-------|--------------|-----------|------------|
| port-1-10       | VDSL2 | set-ge-10410 | 64        | 10.10.10.2 |
| port-1-11       | VDSL2 | set-ge-10411 | 64        | 11.11.11.2 |
| port-2-10       | VDSL2 | ge-1/0/4.12  | 64        | 10.12.12.2 |
| port-2-11       | VDSL2 | ge-1/0/4.13  | 64        | 10.13.13.2 |

### show ancp subscriber detail

```
user@host> show ancp subscriber detail
```

Subscriber Information

- \* Access Loop Circuit Identifier : circuit 101
  - Neighbor IP Address : 10.0.1.3
  - Aggregate Circuit Identifier Binary : 0/0
  - DSL Type : ADSL1
  - DSL Line State : Idle
  - DSL Line Data Link : Data link 2
  - DSL Line Encapsulation : N/A
  - DSL Line Encapsulation Payload : N/A
  - Interface Type : N/A
  - Interface : ----
  - Actual Net Data Upstream : 32
  - Actual Net Data Downstream : 32
  - Minimum Net Data Upstream : 0
  - Minimum Net Data Downstream : 0
  - Maximum Net Data Upstream : 0
  - Maximum Net Data Downstream : 0
  - Attainable Net Data Upstream : 1024
  - Attainable Net Data Downstream : 8192
  - Minimum Low Power Data Downstream : 32
  - Minimum Low Power Data Upstream : 32
  - Maximum Interleave Delay Downstream : 20
  - Maximum Interleave Delay Upstream : 20
  - Actual Interleave Delay Downstream : 20
  - Actual Interleave Delay Upstream : 20
- \* Access Loop Circuit Identifier: circuit 102
  - Neighbor IP Address : 10.0.1.3
  - Aggregate Circuit Identifier Binary : 0/0
  - DSL Type : ADSL1
  - DSL Line State : Idle
  - DSL Line Data Link : Data link 2
  - DSL Line Encapsulation : N/A
  - DSL Line Encapsulation Payload : N/A

```
Interface Type : N/A
Interface : ----
Actual Net Data Upstream : 32
Actual Net Data Downstream : 32
Minimum Net Data Upstream : 0
Minimum Net Data Downstream : 0
Maximum Net Data Upstream : 0
Maximum Net Data Downstream : 0
Attainable Net Data Upstream : 1024
Attainable Net Data Downstream : 8192
Minimum Low Power Data Downstream : 32
Minimum Low Power Data Upstream : 32
Maximum Interleave Delay Downstream : 20
Maximum Interleave Delay Upstream : 20
Actual Interleave Delay Downstream : 20
Actual Interleave Delay Upstream : 20
```

...

#### show ancp subscriber identifier identifier-string detail

```
user@host> show ancp subscriber identifier port-1-11 detail
```

```
Access Loop Identifier : port-1-11
Neighbor IP Address : 10.11.11.2
Aggregate Circuit Identifier Binary : 0/0
DSL Type : DSL 0
Interface Type : interface-set
Interface : set-ge-10411
DSL Line State : Show Time
Actual Net Data Upstream : 64
Actual Net Data Downstream : 64
DSL Line Data Link : AAL5
DSL Line Encapsulation : N/A
DSL Line Encapsulation Payload : N/A
Minimum Net Data Upstream : 64
Minimum Net Data Downstream : 64
Maximum Net Data Upstream : 64
Maximum Net Data Downstream : 64
Attainable Net Data Upstream : 64
Attainable Net Data Downstream : 64
Minimum Low Power Data Downstream : 64
Minimum Low Power Data Upstream : 64
Maximum Interleave Delay Downstream : 50
Maximum Interleave Delay Upstream : 50
Actual Interleave Delay Downstream : 50
Actual Interleave Delay Upstream : 50
```

## show ancp summary

|                                 |                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ancp summary                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 13.1.                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Display a summary of the counts and states for all ANCP neighbors and subscribers.                                                                                                                                                                                                                       |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ancp neighbor on page 1353</a></li> <li>• <a href="#">show ancp summary neighbor on page 1373</a></li> <li>• <a href="#">show ancp subscriber on page 1366</a></li> <li>• <a href="#">show ancp summary subscriber on page 1375</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ancp summary on page 1372</a>                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>            | <a href="#">Table 72 on page 1371</a> lists the output fields for the <b>show ancp summary</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                          |

**Table 72: show ancp summary Output Fields**

| Field Name          | Field Description                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Configured</b>   | Number of ANCP neighbors in the <b>Configured</b> state; that is, that have been configured but never established.                                         |
| <b>Establishing</b> | Number of ANCP neighbors in the <b>Establishing</b> state; that is, where negotiations are in progress.                                                    |
| <b>Established</b>  | Number of ANCP neighbors in the <b>Established</b> state; that is, where negotiations have succeeded and the ANCP session has been established.            |
| <b>Not Estblshd</b> | Number of ANCP neighbors in the <b>Not Estblshd</b> state; that is, that have lost a previously established adjacency and are ready to begin negotiations. |
| <b>Total</b>        | Total number of ANCP neighbors; sum of neighbors in the <b>Configured</b> , <b>Establishing</b> , <b>Established</b> , and <b>Not Estblshd</b> states.     |
| <b>Showtime</b>     | Number of DSL lines in <b>Showtime</b> state.                                                                                                              |
| <b>Idle</b>         | Number of DSL lines in <b>Idle</b> state.                                                                                                                  |
| <b>Silent</b>       | Number of DSL lines in <b>Silent</b> state.                                                                                                                |
| <b>Unknown</b>      | Number of DSL lines where the state is not <b>Showtime</b> , <b>Idle</b> , or <b>Silent</b> .                                                              |

Table 72: show ancp summary Output Fields (*continued*)

| Field Name   | Field Description                                                                                                                                |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Total</b> | Total number of DSL lines (ANCP subscribers); sum of DSL lines in the <b>Showtime</b> , <b>Idle</b> , <b>Silent</b> , and <b>Unknown</b> states. |

## Sample Output

### show ancp summary

```
user@host> show ancp summary
```

#### Neighbors Summary:

| Configured | Establishing | Established | Not Established | Total |
|------------|--------------|-------------|-----------------|-------|
| -----      | -----        | -----       | -----           | ----- |
| 22         | 0            | 2           | 0               | 24    |

#### Subscribers Summary:

| Showtime | Idle  | Silent | Unknown | Total |
|----------|-------|--------|---------|-------|
| -----    | ----- | -----  | -----   | ----- |
| 4        | 0     | 0      | 0       | 4     |

## show ancp summary neighbor

|                                 |                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ancp summary neighbor<br><ip-address <i>ip-address</i>   system-name <i>mac-address</i> >                                                                                                                                       |
| <b>Release Information</b>      | Command introduced in Junos OS Release 13.1.                                                                                                                                                                                         |
| <b>Description</b>              | Display a summary of the counts and states for all ANCP neighbors and of the neighbor's subscribers when you specify a particular neighbor.                                                                                          |
| <b>Options</b>                  | <b>ip-address <i>ip-address</i></b> —(Optional) IP address of the ANCP neighbor (access node).<br><b>system-name <i>mac-address</i></b> —(Optional) MAC address of the ANCP neighbor (access node).                                  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ancp summary on page 1371</a></li> <li>• <a href="#">show ancp subscriber on page 1366</a></li> <li>• <a href="#">show ancp summary subscriber on page 1375</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ancp summary neighbor on page 1374</a><br><a href="#">show ancp summary neighbor (IP Address) on page 1374</a><br><a href="#">show ancp summary neighbor (MAC Address) on page 1374</a>                             |
| <b>Output Fields</b>            | <a href="#">Table 73 on page 1373</a> lists the output fields for the <b>show ancp summary</b> command. Output fields are listed in the approximate order in which they appear.                                                      |

**Table 73: show ancp summary neighbor Output Fields**

| Field Name          | Field Description                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Configured</b>   | Number of ANCP neighbors in the <b>Configured</b> state; that is, that have been configured but never established.                                         |
| <b>Establishing</b> | Number of ANCP neighbors in the <b>Establishing</b> state; that is, where negotiations are in progress.                                                    |
| <b>Established</b>  | Number of ANCP neighbors in the <b>Established</b> state; that is, where negotiations have succeeded and the ANCP session has been established.            |
| <b>Not Estblshd</b> | Number of ANCP neighbors in the <b>Not Estblshd</b> state; that is, that have lost a previously established adjacency and are ready to begin negotiations. |
| <b>Total</b>        | Total number of ANCP neighbors; sum of neighbors in the <b>Configured</b> , <b>Establishing</b> , <b>Established</b> , and <b>Not Estblshd</b> states.     |
| <b>Showtime</b>     | Number of DSL lines for the neighbor in <b>Showtime</b> state.                                                                                             |

Table 73: show ancp summary neighbor Output Fields (*continued*)

| Field Name     | Field Description                                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Idle</b>    | Number of DSL lines for the neighbor in <b>Idle</b> state.                                                                                       |
| <b>Silent</b>  | Number of DSL lines for the neighbor in <b>Silent</b> state.                                                                                     |
| <b>Unknown</b> | Number of DSL lines for the neighbor where the state is not <b>Showtime</b> , <b>Idle</b> , or <b>Silent</b> .                                   |
| <b>Total</b>   | Total number of DSL lines (ANCP subscribers); sum of DSL lines in the <b>Showtime</b> , <b>Idle</b> , <b>Silent</b> , and <b>Unknown</b> states. |

## Sample Output

### show ancp summary neighbor

```
user@host> show ancp summary neighbor
```

```
Neighbors Summary:
```

| Configured | Establishing | Established | Not Established | Total |
|------------|--------------|-------------|-----------------|-------|
| 22         | 0            | 2           | 0               | 24    |

### show ancp summary neighbor (IP Address)

```
user@host> show ancp summary neighbor ip-address 192.168.10.1
```

```
Neighbor Summary:192.168.10.1 status Established
```

```
Subscribers Summary:
```

| Show Time | Idle | Silent | Unknown | Total |
|-----------|------|--------|---------|-------|
| 6         | 0    | 0      | 0       | 6     |

### show ancp summary neighbor (MAC Address)

```
user@host> show ancp summary neighbor system-name 00:00:64:1b:01:02
```

```
Neighbor Summary:00:00:64:1b:01:02 status Established
```

```
Subscribers Summary:
```

| Show Time | Idle | Silent | Unknown | Total |
|-----------|------|--------|---------|-------|
| 5         | 1    | 2      | 0       | 8     |



show ancp summary subscriber

|                          |                                                                                                                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | show ancp summary subscriber                                                                                                                                                                                                 |
| Release Information      | Command introduced in Junos OS Release 13.1.                                                                                                                                                                                 |
| Description              | Display a summary of the counts and states for all ANCP subscribers.                                                                                                                                                         |
| Options                  | This command has no options.                                                                                                                                                                                                 |
| Required Privilege Level | view                                                                                                                                                                                                                         |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">show ancp summary on page 1371</a></li><li>• <a href="#">show ancp neighbor on page 1353</a></li><li>• <a href="#">show ancp summary neighbor on page 1373</a></li></ul> |
| List of Sample Output    | <a href="#">show ancp summary subscriber on page 1375</a>                                                                                                                                                                    |
| Output Fields            | <a href="#">Table 74 on page 1375</a> lists the output fields for the <b>show ancp summary subscriber</b> command. Output fields are listed in the approximate order in which they appear.                                   |

Table 74: show ancp summary subscriber Output Fields

| Field Name | Field Description                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Showtime   | Number of DSL lines in <b>Showtime</b> state.                                                                                                    |
| Idle       | Number of DSL lines in <b>Idle</b> state.                                                                                                        |
| Silent     | Number of DSL lines in <b>Silent</b> state.                                                                                                      |
| Unknown    | Number of DSL lines where the state is not <b>Showtime</b> , <b>Idle</b> , or <b>Silent</b> .                                                    |
| Total      | Total number of DSL lines (ANCP subscribers); sum of DSL lines in the <b>Showtime</b> , <b>Idle</b> , <b>Silent</b> , and <b>Unknown</b> states. |

Sample Output

show ancp summary subscriber

```
user@host> show ancp summary subscriber

Subscribers Summary:
Show Time Idle Silent Unknown Total

 8 1 0 1 10
```



## CHAPTER 16

# BFD Operational Commands

- `clear bfd adaptation`
- `clear bfd session`
- `show bfd session`

## clear bfd adaptation

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear bfd adaptation</code><br><code>&lt;address <i>session-address</i>&gt;</code><br><code>&lt;discriminator <i>discr-number</i>&gt;</code>                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Clear adaptation for Bidirectional Forwarding Detection (BFD) sessions. BFD is a simple hello mechanism that detects failures in a network. Configured BFD interval timers can change, adapting to network situations. Use this command to return BFD interval timers to their configured values.</p> <p>The <b>clear bfd adaptation</b> command is hitless, meaning that the command does not affect traffic flow on the routing device.</p> |
| <b>Options</b>                  | <p><b>none</b>—Clear adaptation for all BFD sessions.</p> <p><b>address <i>session-address</i></b>—(Optional) Clear adaptation for all BFD sessions matching the specified address.</p> <p><b>discriminator <i>discr-number</i></b>—(Optional) Clear adaptation for the local BFD session matching the specified discriminator.</p>                                                                                                              |
| <b>Additional Information</b>   | For more information, see the description of the <b>bfd-liveness-detection</b> configuration statement in the <i>Junos Routing Protocols Configuration Guide</i> .                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show bfd session on page 1380</a></li></ul>                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">clear bfd adaptation on page 1378</a>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### clear bfd adaptation

```
user@host> clear bfd adaptation
```

## clear bfd session

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1379</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1379</a>                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                   | <pre>clear bfd session &lt;address <i>session-address</i>&gt; &lt;discriminator <i>discr-number</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>clear bfd session &lt;address <i>session-address</i>&gt; &lt;discriminator <i>discr-number</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>                              | Drop one or more Bidirectional Forwarding Detection (BFD) sessions.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                  | <p><b>none</b>—Drop all BFD sessions.</p> <p><b>address <i>session-address</i></b>—(Optional) Drop all BFD sessions matching the specified address.</p> <p><b>discriminator <i>discr-number</i></b>—(Optional) Drop the local BFD session matching the specified discriminator.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                 | clear                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li>• <a href="#">show bfd session on page 1380</a></li> </ul>                                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>                    | <a href="#">clear bfd session on page 1379</a>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### clear bfd session

```
user@host> clear bfd session
```

## show bfd session

---

**List of Syntax**   [Syntax on page 1380](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 1380](#)

**Syntax**   `show bfd session`  
                  `<brief | detail | extensive | summary>`  
                  `<address address>`  
                  `<client rsvp-oam (brief | detail | extensive | summary) | vpls-oam (brief | detail | extensive |`  
                          `instance instance-name | summary)>`  
                  `<discriminator discriminator>`  
                  `<logical-system (all | logical-system-name)>`  
                  `<prefix address>`  
                  `<subscriber (address destination-address | discriminator discriminator | extensive)>`

**Syntax (EX Series Switch and QFX Series)**   `show bfd session`  
                                                  `<brief | detail | extensive | summary>`  
                                                  `<address address>`  
                                                  `<client rsvp-oam (brief | detail | extensive | summary) | vpls-oam (brief | detail | extensive |`  
                                                          `instance instance-name | summary)>`  
                                                  `<discriminator discriminator>`  
                                                  `<prefix address>`

**Release Information**   Command introduced before Junos OS Release 7.4.  
                              Options **discriminator** and **address** introduced in Junos OS Release 8.2.  
                              Option **prefix** introduced in Junos OS Release 9.0.  
                              Command introduced in Junos OS Release 12.1 for the QFX Series.  
                              Option **client** introduced in Junos OS Release 12.3R3.  
                              Option **subscriber** introduced in Junos OS Release 15.1 for the MX Series.

**Description**   Display information about active Bidirectional Forwarding Detection (BFD) sessions.

**Options**   **none**—(Same as **brief**) Display information about active BFD sessions.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**address *address***—(Optional) Display information about the BFD session for the specified neighbor address.

**client rsvp-oam**  
                  **(brief | detail | extensive | summary)**  
                  **| vpls-oam**  
                  **(brief | detail | extensive | instance *instance-name* | summary)**—(Optional) Display information about RSVP-OAM or VPLS-OAM BFD sessions in the specified level of output. For VPLS-OAM, display the specified level of output or display information about all of the BFD sessions for the specified VPLS routing instance.

**discriminator *discriminator***—(Optional) Display information about the BFD session using the specified local discriminator.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**<subscriber (address *destination-address* | discriminator *discriminator* | extensive)>**—(Optional) Display information about all BFD sessions for subscribers, or for a single BFD subscriber session with a particular destination address, or with a particular denominator.

**Required Privilege Level** view

**Related Documentation**

- [clear bfd session on page 1379](#)
- *Understanding BFD for Static Routes for Faster Network Failure Detection*
- *Example: Configuring BFD for Static Routes*
- *Understanding BFD for OSPF*
- *Example: Configuring BFD for OSPF*
- *Understanding BFD for BGP*
- *Example: Configuring BFD on Internal BGP Peer Sessions*
- *Understanding Bidirectional Forwarding Detection Authentication for PIM*
- *Configuring BFD for PIM*
- *Understanding BFD for IS-IS*

**List of Sample Output**

- [show bfd session on page 1385](#)
- [show bfd session brief on page 1386](#)
- [show bfd session detail on page 1386](#)
- [show bfd session detail \(with Authentication\) on page 1386](#)
- [show bfd session address extensive on page 1386](#)
- [show bfd session client rsvp-oam on page 1387](#)
- [show bfd session client vpls-oam summary on page 1387](#)
- [show bfd session client vpls-oam instance instance-name on page 1387](#)
- [show bfd session extensive on page 1387](#)
- [show bfd session extensive \(with Authentication\) on page 1388](#)
- [show bfd session summary on page 1388](#)
- [show bfd session subscriber on page 1388](#)
- [show bfd session subscriber address on page 1389](#)
- [show bfd session subscriber extensive on page 1389](#)
- [show bfd session subscriber discriminator extensive on page 1389](#)

**Output Fields** Table 75 on page 1381 describes the output fields for the **show bfd session** command. Output fields are listed in the approximate order in which they appear.

**Table 75: show bfd session Output Fields**

| Field Name | Field Description                           | Level of Output                |
|------------|---------------------------------------------|--------------------------------|
| Address    | Address on which the BFD session is active. | brief detail extensive<br>none |

Table 75: show bfd session Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                       |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| State             | State of the BFD session: <b>Up</b> , <b>Down</b> , <b>Init</b> (initializing), or <b>Failing</b> .                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>brief detail extensive</b><br>none |
| Interface         | Interface on which the BFD session is active.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>brief detail extensive</b><br>none |
| Detect Time       | Negotiated time interval, in seconds, used to detect BFD control packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>brief detail extensive</b><br>none |
| Transmit Interval | Time interval, in seconds, used by the transmitting system to send BFD control packets.                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>brief detail extensive</b><br>none |
| Multiplier        | Negotiated multiplier by which the time interval is multiplied to determine the detection time for the transmitting system.                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>               |
| Session up time   | How long a BFD session has been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>               |
| Client            | Protocol for which the BFD session is active: <b>ISIS</b> , <b>OSPF</b> , <b>DHCP</b> , or <b>Static</b> .                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>               |
| TX interval       | Time interval, in seconds, used by the host system to transmit BFD control packets.                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>brief detail extensive</b><br>none |
| RX interval       | Time interval, in seconds, used by the host system to receive BFD control packets.                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief detail extensive</b><br>none |
| Authenticate      | Indicates that BFD authentication is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>               |
| keychain          | Name of the security authentication keychain being used by a specific client.<br><br>BFD authentication information for a client is provided in a single line and includes the <b>keychain</b> , <b>algo</b> , and <b>mode</b> parameters. Multiple clients can be configured on a BFD session.                                                                                                                                                                                                                          | <b>extensive</b>                      |
| algo              | BFD authentication algorithm being used for a specific client: <b>keyed-md5</b> , <b>keyed-sha-1</b> , <b>meticulous-keyed-md5</b> , <b>meticulous-keyed-sha-1</b> , or <b>simple-password</b> .<br><br>BFD authentication information for a client is provided in a single line and includes the <b>keychain</b> , <b>algo</b> , and <b>mode</b> parameters. Multiple clients can be configured on a BFD session.                                                                                                       | <b>extensive</b>                      |
| mode              | Level of BFD authentication enforcement being used by a specific client: <b>strict</b> or <b>loose</b> . Strict enforcement indicates that authentication is configured at both ends of the session (the default). Loose enforcement indicates that one end of the session might not be authenticated.<br><br>BFD authentication information for a client is provided in a single line and includes the <b>keychain</b> , <b>algo</b> , and <b>mode</b> parameters. Multiple clients can be configured on a BFD session. | <b>extensive</b>                      |



Table 75: show bfd session Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Local diagnostic           | <p>Local diagnostic information about failing BFD sessions.</p> <p>Following are the expected values for Local Diagnostic output field:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No diagnostic</li> <li>• <b>CtlExpire</b>—Control detection time expired</li> <li>• <b>EchoExpire</b>—Echo detection time expired</li> <li>• <b>NbrSignal</b>—Neighbor signalled session down</li> <li>• <b>FwdPlaneReset</b>—Forwarding plane reset</li> <li>• <b>PathDown</b>—Path down</li> <li>• <b>ConcatPathDown</b>—Concatenated path down</li> <li>• <b>AdminDown</b>—Administratively down</li> </ul>   | <b>detail extensive</b> |
| Remote diagnostic          | <p>Remote diagnostic information about failing BFD sessions.</p> <p>Following are the expected values for Remote Diagnostic output field:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No diagnostic</li> <li>• <b>CtlExpire</b>—Control detection time expired</li> <li>• <b>EchoExpire</b>—Echo detection time expired</li> <li>• <b>NbrSignal</b>—Neighbor signalled session down</li> <li>• <b>FwdPlaneReset</b>—Forwarding plane reset</li> <li>• <b>PathDown</b>—Path down</li> <li>• <b>ConcatPathDown</b>—Concatenated path down</li> <li>• <b>AdminDown</b>—Administratively down</li> </ul> | <b>detail extensive</b> |
| Remote state               | Reports whether the remote system's BFD packets have been received and whether the remote system is receiving transmitted control packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| Version                    | BFD version: 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>extensive</b>        |
| Replicated                 | The <b>replicated</b> flag appears when nonstop routing or graceful Routing Engine switchover is configured and the BFD session has been replicated to the backup Routing Engine.                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |
| Min async interval         | Minimum amount of time, in seconds, between asynchronous control packet transmissions across the BFD session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>        |
| Min slow interval          | Minimum amount of time, in seconds, between synchronous control packet transmissions across the BFD session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b>        |
| Adaptive async TX interval | Transmission interval being used because of adaptation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |
| RX interval                | Minimum required receive interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>        |
| Local min TX interval      | Minimum amount of time, in seconds, between control packet transmissions on the local system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>        |

Table 75: show bfd session Output Fields (*continued*)

| Field Name                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Local min RX interval               | Minimum amount of time, in seconds, between control packet detections on the local system.                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| Remote min TX interval              | Minimum amount of time, in seconds, between control packet transmissions on the remote system.                                                                                                                                                                                                                                                                                                                     | <b>extensive</b> |
| Remote min TX interval              | Minimum amount of time, in seconds, between control packet detections on the remote system.                                                                                                                                                                                                                                                                                                                        | <b>extensive</b> |
| Threshold transmission interval     | Threshold for notification if the transmission interval increases.                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b> |
| Threshold for detection time        | Threshold for notification if the detection time increases.                                                                                                                                                                                                                                                                                                                                                        | <b>extensive</b> |
| Local discriminator                 | Authentication code used by the local system to identify that BFD session.                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| Remote discriminator                | Authentication code used by the remote system to identify that BFD session.                                                                                                                                                                                                                                                                                                                                        | <b>extensive</b> |
| Echo mode                           | Information about the state of echo transmissions on the BFD session.                                                                                                                                                                                                                                                                                                                                              | <b>extensive</b> |
| Prefix                              | LDP FEC address associated with the BFD session.                                                                                                                                                                                                                                                                                                                                                                   | All levels       |
| Egress, Destination                 | Displays the LDP FEC destination address. This field is displayed only on a router at the egress of an LDP FEC, where the BFD session has an LDP Operation, Administration, and Maintenance (OAM) client.                                                                                                                                                                                                          | All levels       |
| Remote is control-plane independent | <p>The BFD session on the remote peer is running on its Packet Forwarding Engine. In this case, when the remote node undergoes a graceful restart, the local peer can help the remote peer with the graceful restart.</p> <p>The following BFD sessions are not distributed to the Packet Forwarding Engine: tunnel-encapsulated sessions, and sessions over integrated routing and bridging (IRB) interfaces.</p> | <b>extensive</b> |

Table 75: show bfd session Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Authentication           | <p>Summary status of BFD authentication:</p> <ul style="list-style-type: none"> <li><b>status</b>—<b>enabled/active</b> indicates authentication is configured and active. <b>enabled/inactive</b> indicates authentication is configured but not active. This only occurs when the remote end of the session does not support authentication and loose checking is configured.</li> <li><b>keychain</b>—Name of the security authentication keychain associated with the specified BFD session.</li> <li><b>algo</b>—BFD authentication algorithm being used: <b>keyed-md5</b>, <b>keyed-sha-1</b>, <b>meticulous-keyed-md5</b>, <b>meticulous-keyed-sha-1</b>, or <b>simple-password</b>.</li> <li><b>mode</b>—Level of BFD authentication enforcement: <b>strict</b> or <b>loose</b>. Strict enforcement indicates authentication is configured at both ends of the session (the default). Loose enforcement indicates that one end of the session might not be authenticated.</li> </ul> <p>This information is only shown if BFD authentication is configured.</p> | <b>extensive</b>        |
| Session ID               | The BFD session ID number that represents the protection using MPLS fast reroute (FRR) and loop-free alternate (LFA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| sessions                 | Total number of active BFD sessions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels              |
| clients                  | Total number of clients that are hosting active BFD sessions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels              |
| Cumulative transmit rate | Total number of BFD control packets transmitted per second on all active sessions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels              |
| Cumulative receive rate  | Total number of BFD control packets received per second on all active sessions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels              |
| Multi-hop, min-recv-TTL  | Minimum time to live (TTL) accepted if the session is configured for multihop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b>        |
| route table              | Route table used if the session is configured for multihop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>        |
| local address            | <p>Local address of the source used if the session is configured for multihop.</p> <p>The source IP address for outgoing BFD packets from the egress side of an MPLS BFD session is based on the outgoing interface IP address.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>extensive</b>        |

## Sample Output

### show bfd session

```
user@host> show bfd session
```

| Address   | State | Interface  | Detect Time | Transmit Interval | Multiplier |
|-----------|-------|------------|-------------|-------------------|------------|
| 10.9.1.33 | Up    | so-7/1/0.0 | 0.600       | 0.200             | 3          |
| 10.9.1.29 | Up    | ge-4/0/0.0 | 0.600       | 0.200             | 3          |

```
2 sessions, 2 clients
```

```
Cumulative transmit rate 10.0 pps, cumulative receive rate 10.0 pps
```

### show bfd session brief

The output for the **show bfd session brief** command is identical to that for the **show bfd session** command.

### show bfd session detail

```
user@host> show bfd session detail
```

| Address                                                            | State | Interface  | Detect Time | Transmit Interval | Multiplier |
|--------------------------------------------------------------------|-------|------------|-------------|-------------------|------------|
| 10.9.1.33                                                          | Up    | so-7/1/0.0 | 0.600       | 0.200             | 3          |
| Client OSPF, TX interval 0.200, RX interval 0.200, multiplier 3    |       |            |             |                   |            |
| Session up time 3d 00:34                                           |       |            |             |                   |            |
| Local diagnostic None, remote diagnostic None                      |       |            |             |                   |            |
| Remote state Up, version 1                                         |       |            |             |                   |            |
| Replicated                                                         |       |            |             |                   |            |
| 10.9.1.29                                                          | Up    | ge-4/0/0.0 | 0.600       | 0.200             | 3          |
| Client ISIS L2, TX interval 0.200, RX interval 0.200, multiplier 3 |       |            |             |                   |            |
| Session up time 3d 00:29, previous down time 00:00:01              |       |            |             |                   |            |
| Local diagnostic NbrSignal, remote diagnostic AdminDown            |       |            |             |                   |            |
| Remote state Up, version 1                                         |       |            |             |                   |            |

2 sessions, 2 clients  
Cumulative transmit rate 10.0 pps, cumulative receive rate 10.0 pps

### show bfd session detail (with Authentication)

```
user@host> show bfd session detail
```

| Address                                                                              | State | Interface  | Detect Time | Transmit Interval | Multiplier |
|--------------------------------------------------------------------------------------|-------|------------|-------------|-------------------|------------|
| 10.9.1.33                                                                            | Up    | so-7/1/0.0 | 0.600       | 0.200             | 3          |
| Client OSPF, TX interval 0.200, RX interval 0.200, multiplier 3, <b>Authenticate</b> |       |            |             |                   |            |
| Session up time 3d 00:34                                                             |       |            |             |                   |            |
| Local diagnostic None, remote diagnostic None                                        |       |            |             |                   |            |
| Remote state Up, version 1                                                           |       |            |             |                   |            |
| Replicated                                                                           |       |            |             |                   |            |
| 10.9.1.29                                                                            | Up    | ge-4/0/0.0 | 0.600       | 0.200             | 3          |
| Client ISIS L2, TX interval 0.200, RX interval 0.200, multiplier 3                   |       |            |             |                   |            |
| Session up time 3d 00:29, previous down time 00:00:01                                |       |            |             |                   |            |
| Local diagnostic NbrSignal, remote diagnostic AdminDown                              |       |            |             |                   |            |
| Remote state Up, version 1                                                           |       |            |             |                   |            |

2 sessions, 2 clients  
Cumulative transmit rate 10.0 pps, cumulative receive rate 10.0 pps

### show bfd session address extensive

```
user@host> show bfd session 10.255.245.212 extensive
```

| Address                                                           | State | Interface | Detect Time | Transmit Interval | Multiplier |
|-------------------------------------------------------------------|-------|-----------|-------------|-------------------|------------|
| 10.255.245.212                                                    | Up    |           | 1.200       | 0.400             | 3          |
| Client Static, TX interval 0.400, RX interval 0.400, multiplier 3 |       |           |             |                   |            |
| Session up time 00:17:03, previous down time 00:00:14             |       |           |             |                   |            |
| Local diagnostic CtlExpire, remote diagnostic NbrSignal           |       |           |             |                   |            |
| Remote state Up, version 1                                        |       |           |             |                   |            |
| Replicated                                                        |       |           |             |                   |            |
| Min async interval 0.400, min slow interval 1.000                 |       |           |             |                   |            |
| Adaptive async tx interval 0.400, rx interval 0.400               |       |           |             |                   |            |
| Local min tx interval 0.400, min rx interval 0.400, multiplier 3  |       |           |             |                   |            |
| Remote min tx interval 0.400, min rx interval 0.400, multiplier 3 |       |           |             |                   |            |

```

Threshold transmission interval 0.000, Threshold for detection time 0.000
Local discriminator 6, remote discriminator 16
Echo mode disabled/inactive
Multi-hop, min-recv-TTL 255, route-table 0, local-address 10.255.245.205

```

```

1 sessions, 1 clients
Cumulative transmit rate 2.5 pps, cumulative receive rate 2.5 pps

```

#### show bfd session client rsvp-oam

```

user@host> show bfd session client rsvp-oam

```

| Address       | State | Interface | Detect Time | Transmit Interval | Multiplier |
|---------------|-------|-----------|-------------|-------------------|------------|
| 192.168.0.223 | Up    |           | 540.000     | 180.000           | 3          |

```

1 Up sessions, 0 Down sessions
1 sessions, 1 clients
Cumulative transmit rate 0.0 pps, cumulative receive rate 0.0 pps

```

#### show bfd session client vpls-oam summary

```

user@host> show bfd session client vpls-oam summary
1 Up sessions, 1 Down sessions
2 sessions, 2 clients
Cumulative transmit rate 2.0 pps, cumulative receive rate 1.0 pps

```

#### show bfd session client vpls-oam instance instance-name

```

user@host> show bfd session client vpls-oam instance vpls

```

| Address   | State | Interface | Detect Time | Transmit Interval | Multiplier |
|-----------|-------|-----------|-------------|-------------------|------------|
| 127.0.0.1 | Up    | ae9.0     | 3.000       | 1.000             | 3          |

```

1 Up Sessions, 0 Down Sessions
1 sessions, 1 clients
Cumulative transmit rate 1.0 pps, cumulative receive rate 1.0 pps

```

#### show bfd session extensive

```

user@host> show bfd session extensive

```

| Address   | State | Interface  | Detect Time | Transmit Interval | Multiplier |
|-----------|-------|------------|-------------|-------------------|------------|
| 10.31.1.2 | Up    | ge-2/1/8.0 | 0.030       | 0.010             | 3          |

```

Client OSPF realm ospf-v2 Area 0.0.0.0, TX interval 0.010, RX interval 0.010
Session up time 00:10:13
Local diagnostic None, remote diagnostic None
Remote state Up, version 1
Replicated
Min async interval 0.010, min slow interval 1.000
Adaptive async TX interval 0.010, RX interval 0.010
Local min TX interval 0.010, minimum RX interval 0.010, multiplier 3
Remote min TX interval 0.010, min RX interval 0.010, multiplier 3
Local discriminator 12, remote discriminator 4
Echo mode disabled/inactive
Remote is control-plane independent
Session ID: 0x201
Micro-BFD Session

```

| Address | State | Interface | Detect Time | Transmit Interval | Multiplier |
|---------|-------|-----------|-------------|-------------------|------------|
|---------|-------|-----------|-------------|-------------------|------------|

```

10.31.2.2 Up ge-2/1/4.0 0.030 0.010 3
Client OSPF realm ospf-v2 Area 0.0.0.0, TX interval 0.010, RX interval 0.010
Session up time 00:10:14
Local diagnostic None, remote diagnostic NbrSignal
Remote state Up, version 1
Replicated
Min async interval 0.010, min slow interval 1.000
Adaptive async TX interval 0.010, RX interval 0.010
Local min TX interval 0.010, minimum RX interval 0.010, multiplier 3
Remote min TX interval 0.010, min RX interval 0.010, multiplier 3
Local discriminator 13, remote discriminator 5
Echo mode disabled/inactive
Remote is control-plane independent
Session ID: 0x202

2 sessions, 2 clients
Cumulative transmit rate 200.0 pps, cumulative receive rate 200.0 pps

```

#### show bfd session extensive (with Authentication)

```

user@host> show bfd session extensive

Address State Interface Detect Transmit
192.168.208.26 Up so-1/0/0.0 Time Interval Multiplier
Client Static, TX interval 0.600, RX interval 0.600, Authenticate
keychain bfd, algo keyed-md5, mode loose
Session up time 00:18:07
Local diagnostic None, remote diagnostic NbrSignal
Remote state Up, version 1
Replicated
Min async interval 0.600, min slow interval 1.000
Adaptive async TX interval 0.600, RX interval 0.600
Local min TX interval 0.600, minimum RX interval 0.600, multiplier 10
Remote min TX interval 0.800, min RX interval 0.800, multiplier 3
Local discriminator 2, remote discriminator 3
Echo mode disabled/inactive
Authentication enabled/active, keychain bfd, algo keyed-md5, mode loose

1 sessions, 1 clients
Cumulative transmit rate 1.2 pps, cumulative receive rate 1.2 pps

```

#### show bfd session summary

```

user@host> show bfd session summary
2 sessions, 2 clients
Cumulative transmit rate 10.0 pps, cumulative receive rate 10.0 pps

```

#### show bfd session subscriber

```

user@host> show bfd session subscriber

Detect Transmit
Address State Interface Time Interval Multiplier
1.0.0.2 Up ae0.0 90.000 30.000 3
1.0.0.6 Up ae0.1 90.000 30.000 3
1.0.0.10 Up ae0.2 90.000 30.000 3
1.0.0.14 Up ae0.3 90.000 30.000 3
1.0.0.18 Up ae0.4 90.000 30.000 3

20 sessions, 20 clients

```

**show bfd session subscriber address**

```

user@host> show bfd session subscriber address 1.0.0.2
 Detect Transmit
Address State Interface Time Interval Multiplier
1.0.0.2 Up ae0.0 90.000 30.000 3

1 sessions, 1 clients
Cumulative transmit rate 5.0 pps, cumulative receive rate 5.0 pps

```

**show bfd session subscriber extensive**

```

user@host> show bfd session subscriber extensive
 Detect Transmit
Address State Interface Time Interval Multiplier
1.0.0.2 Up ae0.0 90.000 30.000 3

Client DHCP, TX interval 30.000, RX interval 30.000
Session up time 09:11:50
Local diagnostic None, remote diagnostic NbrSignal
Remote state Up, version 1
Replicated
Min async interval 30.000, min slow interval 30.000
Adaptive async TX interval 30.000, RX interval 30.000
Local min TX interval 30.000, minimum RX interval 30.000, multiplier 3
Remote min TX interval 30.000, min RX interval 30.000, multiplier 3
Local discriminator 20, remote discriminator 16
Echo mode disabled/inactive
Remote is control-plane independent
Session ID: 0x1

 Detect Transmit
Address State Interface Time Interval Multiplier
1.0.0.6 Up ae0.1 90.000 30.000 3

Client DHCP, TX interval 30.000, RX interval 30.000
Session up time 09:11:50
Local diagnostic None, remote diagnostic NbrSignal
Remote state Up, version 1
Replicated
Min async interval 30.000, min slow interval 30.000
Adaptive async TX interval 30.000, RX interval 30.000
Local min TX interval 30.000, minimum RX interval 30.000, multiplier 3
Remote min TX interval 30.000, min RX interval 30.000, multiplier 3
Local discriminator 21, remote discriminator 17
Echo mode disabled/inactive
Remote is control-plane independent
Session ID: 0x2

```

**show bfd session subscriber discriminator extensive**

```

user@host> show bfd session subscriber discriminator 20 extensive
 Detect Transmit
Address State Interface Time Interval Multiplier
1.0.0.2 Up ae0.0 90.000 30.000 3

Client DHCP, TX interval 30.000, RX interval 30.000
Session up time 09:11:50
Local diagnostic None, remote diagnostic NbrSignal
Remote state Up, version 1
Replicated

```

Min async interval 30.000, min slow interval 30.000  
Adaptive async TX interval 30.000, RX interval 30.000  
Local min TX interval 30.000, minimum RX interval 30.000, multiplier 3  
Remote min TX interval 30.000, min RX interval 30.000, multiplier 3  
Local discriminator 20, remote discriminator 16  
Echo mode disabled/inactive  
Remote is control-plane independent  
Session ID: 0x1

1 sessions, 1 clients  
Cumulative transmit rate 5.0 pps, cumulative receive rate 5.0 pps



## CHAPTER 17

# BGP Operational Commands

- `clear bgp damping`
- `clear bgp neighbor`
- `clear bgp table`
- `show bgp bmp`
- `show bgp group`
- `show bgp group traffic-statistics`
- `show bgp neighbor`
- `show bgp replication`
- `show bgp summary`
- `show policy damping`

## clear bgp damping

---

|                                          |                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1392</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1392</a>                                                                                                                                                                                                                             |
| Syntax                                   | <code>clear bgp damping</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;prefix&gt;</code>                                                                                                                                                                                                  |
| Syntax (EX Series Switch and QFX Series) | <code>clear bgp damping</code><br><code>&lt;prefix&gt;</code>                                                                                                                                                                                                                                                                            |
| Release Information                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                       |
| Description                              | Clear BGP route flap damping information.                                                                                                                                                                                                                                                                                                |
| Options                                  | <b>none</b> —Clear all BGP route flap damping information.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>prefix</b> —(Optional) Clear route flap damping information for only the specified destination prefix. |
| Required Privilege Level                 | clear                                                                                                                                                                                                                                                                                                                                    |
| Related Documentation                    | <ul style="list-style-type: none"><li>• <a href="#">show policy damping on page 1434</a></li><li>• <a href="#">show route damping on page 1882</a></li></ul>                                                                                                                                                                             |
| List of Sample Output                    | <a href="#">clear bgp damping on page 1392</a>                                                                                                                                                                                                                                                                                           |
| Output Fields                            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                    |

### Sample Output

#### clear bgp damping

```
user@host> clear bgp damping
```

## clear bgp neighbor

**List of Syntax**    [Syntax on page 1393](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 1393](#)

**Syntax**    clear bgp neighbor  
                  <all>  
                  <as *as-number*>  
                  <gracefully>  
                  <instance *instance-name*>  
                  <logical-system (all | *logical-system-name*)>  
                  <malformed-route>  
                  <neighbor>  
                  <soft | soft-inbound>  
                  <soft-minimum-igp>  
                  <stale-routes>

**Syntax (EX Series Switch and QFX Series)**    clear bgp neighbor  
                  <all>  
                  <as *as-number*>  
                  <instance *instance-name*>  
                  <malformed-route>  
                  <neighbor>  
                  <soft | soft-inbound>  
                  <soft-minimum-igp>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                  Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                  Command introduced in Junos OS Release 11.3 for the QFX Series.  
                                  Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.  
                                  **malformed-route** option introduced in Junos OS Release 13.2.  
                                  **all** option introduced in Junos OS Release 14.2.  
                                  **gracefully** and **stale-routes** options introduced in Junos OS Release 15.1.

**Description**    Perform one of the following tasks:

- Change the state of one or more BGP neighbors to **IDLE**. For neighbors in the **ESTABLISHED** state, this command drops the TCP connection to the neighbors and then reestablishes the connection.
- (**soft** keyword only) Reapply export policies and send refresh updates to one or more BGP neighbors without changing their state.
- (**soft-inbound** keyword only) Send a route-refresh message to one or more BGP neighbors without changing their state, and reapply import policies on the received updates.

**Options**    **none | all**—(Optional) Change the state of all BGP neighbors to **IDLE**.  
                  Both **clear bgp neighbor** and **clear bgp neighbor all** function identically.

**as *as-number***—(Optional) Apply this command only to neighbors in the specified autonomous system (AS).

**gracefully**—(Optional) Enable the BGP peer to start graceful-restart receiving-speaker mode. The receiving speaker also sends its own routes to the restarted speaker, and sends an End-of-RIB marker when it completes the update. The **clear bgp neighbor neighbor-address gracefully** command is the same as **clear bgp neighbor hard** (the default for **clear bgp neighbor**), but it does not use the new Hard Reset subcode on the Notify and Cease messages that are sent. This allows the neighbor to enter GR or LLGR helper mode, if negotiated. The session is still cleared on this router, and this router does not enter GR or LLGR helper mode.

**instance instance-name**—(Optional) Apply this command only to neighbors for the specified routing instance.

**logical-system (all | logical-system-name)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**malformed-route**—(Optional) Remove malformed routes. If a specific neighbor is provided, Junos OS removes malformed routes for that particular neighbor. Otherwise, Junos OS removes malformed routes for all BGP neighbors. To find routes that have malformed attributes, run the **show route hidden** command, and look for routes marked with **MalformedAttr** in the AS path field.

**neighbor**—(Optional) IP address of a BGP peer. Apply this command only to the specified neighbor.

**soft**—(Optional) Reapply any export policies and send refresh updates to neighbors without clearing the state.

**soft-inbound**—(Optional) Send a route-refresh message to BGP neighbors and reapply import policies on the route updates received from the BGP neighbors without clearing the BGP state.

**soft-minimum-igp**—(Optional) Provide soft refresh of the outbound state when the interior gateway protocol (IGP) metric is reset.

**stale-routes**—(Optional) Any stale route currently being held for the specified neighbor because of BGP graceful restart (GR) or long-lived graceful restart (LLGR) receiver mode operations.

**Required Privilege Level**

clear

**Related Documentation**

- [show bgp neighbor on page 1409](#)

**List of Sample Output**

[clear bgp neighbor on page 1394](#)

**Output Fields**

When you enter this command, you are provided feedback on the status of your request.

## Sample Output

**clear bgp neighbor**

```
user@host> clear bgp neighbor
```



## clear bgp table

---

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                                   | <code>clear bgp table <i>table-name</i></code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                 |
| Syntax (EX Series Switch and QFX Series) | <code>clear bgp table <i>table-name</i></code>                                                                                                                                                                                                                                                                                                                                                           |
| Release Information                      | Command introduced in Junos OS Release 9.0.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                           |
| Description                              | Request that BGP refresh routes in a specified routing table.                                                                                                                                                                                                                                                                                                                                            |
| Options                                  | <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>table-name</i></b> —Request that BGP refresh routes in the specified table.                                                                                                                                                           |
| Additional Information                   | In some cases, a prefix limit is associated with a routing table for a VPN instance. When this limit is exceeded (for example, because of a network misconfiguration), some routes might not be inserted in the table. Such routes need to be added to the table after the network issue is resolved. Use the <b>clear bgp table</b> command to request that BGP refresh routes in a VPN instance table. |
| Required Privilege Level                 | clear                                                                                                                                                                                                                                                                                                                                                                                                    |
| List of Sample Output                    | <a href="#">clear bgp table private.inet.0 on page 1396</a><br><a href="#">clear bgp table inet.6 logical-system all on page 1396</a><br><a href="#">clear bgp table private.inet.6 logical-system ls1 on page 1396</a><br><a href="#">clear bgp table logical-system all inet.0 on page 1396</a><br><a href="#">clear bgp table logical-system ls2 private.inet.0 on page 1397</a>                      |
| Output Fields                            | This command produces no output.                                                                                                                                                                                                                                                                                                                                                                         |

## Sample Output

[clear bgp table private.inet.0](#)

```
user@host> clear bgp table private.inet.0
```

[clear bgp table inet.6 logical-system all](#)

```
user@host> clear bgp table inet.6 logical-system all
```

[clear bgp table private.inet.6 logical-system ls1](#)

```
user@host> clear bgp table private.inet.6 logical-system ls1
```

[clear bgp table logical-system all inet.0](#)

```
user@host> clear bgp table logical-system all inet.0
```

`clear bgp table logical-system ls2 private.inet.0`

`user@host> clear bgp table logical-system ls2 private.inet.0`

## show bgp bmp

|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show bgp bmp</b>                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 13.2X51-D15 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> |
| <b>Description</b>              | Display information about the BGP Monitoring Protocol (BMP).                                                                                                                                                                                                                             |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">show bgp bmp on page 1398</a>                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | <a href="#">Table 76 on page 1398</a> lists the output fields for the <b>show bgp bmp</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                               |

**Table 76: show bgp bmp Output Fields**

| Field Name                          | Field Description                                                                                                                                              |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BMP station address/port</b>     | IP address and port number of the monitoring station to which BGP Monitoring Protocol (BMP) statistics are sent.                                               |
| <b>BMP session state</b>            | Status of the BMP session: <b>UP</b> or <b>DOWN</b> .                                                                                                          |
| <b>Memory consumed by BMP</b>       | Memory used by the active BMP session.                                                                                                                         |
| <b>Statistics timeout</b>           | Amount of time, in seconds, between transmissions of BMP data to the monitoring station.                                                                       |
| <b>Memory limit</b>                 | Threshold, in bytes, at which the routing device stops collecting BMP data.                                                                                    |
| <b>Memory-connect retry timeout</b> | Amount of time, in seconds, after which the routing device attempts to resume a BMP session that was ended after the configured memory threshold was exceeded. |

## Sample Output

### show bgp bmp

```

user@host> show bgp bmp
 BMP station address/port: 172.24.24.157+5454
 BMP session state: DOWN
 Memory consumed by BMP: 0
 Statistics timeout: 15
 Memory limit: 10485760
 Memory connect retry timeout: 600

```





## show bgp group

---

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1400</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1400</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Syntax                                   | <pre>show bgp group &lt;brief   detail   summary&gt; &lt;group-name&gt; &lt;exact-instance instance-name&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;rtf&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Syntax (EX Series Switch and QFX Series) | <pre>show bgp group &lt;brief   detail   summary&gt; &lt;group-name&gt; &lt;exact-instance instance-name&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Release Information                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br><b>exact-instance</b> option introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description                              | Display information about the configured BGP groups.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Options                                  | <p><b>none</b>—Display group information about all BGP groups.</p> <p><b>brief   detail   summary</b>—(Optional) Display the specified level of output.</p> <p><b>group-name</b>—(Optional) Display group information for the specified group.</p> <p><b>exact-instance instance-name</b>—(Optional) Display information for the specified instance only.</p> <p><b>instance instance-name</b>—(Optional) Display information about BGP groups for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show bgp group instance cust1</b> command). The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>rtf</b>—(Optional) Display BGP group route targeting information.</p> |
| Required Privilege Level                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| List of Sample Output                    | <a href="#">show bgp group on page 1404</a><br><a href="#">show bgp group brief on page 1404</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

[show bgp group detail on page 1405](#)  
[show bgp group rtf detail on page 1406](#)  
[show bgp group summary on page 1406](#)

**Output Fields** Table 77 on page 1401 describes the output fields for the **show bgp group** command. Output fields are listed in the approximate order in which they appear.

**Table 77: show bgp group Output Fields**

| Field Name                                | Field Description                                                                                                                                                                                                                                      | Level of Output             |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Group Type or Group</b>                | Type of BGP group: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                | All levels                  |
| <b>group-index</b>                        | Index number for the BGP peer group. The index number differentiates between groups when a single BGP group is split because of different configuration options at the group and peer levels.                                                          | <b>rtf detail</b>           |
| <b>AS</b>                                 | AS number of the peer. For internal BGP (IBGP), this number is the same as <b>Local AS</b> .                                                                                                                                                           | <b>brief detail</b><br>none |
| <b>Local AS</b>                           | AS number of the local routing device.                                                                                                                                                                                                                 | <b>brief detail</b><br>none |
| <b>Name</b>                               | Name of a specific BGP group.                                                                                                                                                                                                                          | <b>brief detail</b><br>none |
| <b>Index</b>                              | Unique index number of a BGP group.                                                                                                                                                                                                                    | <b>brief detail</b><br>none |
| <b>Flags</b>                              | Flags associated with the BGP group. This field is used by Juniper Networks customer support.                                                                                                                                                          | <b>brief detail</b><br>none |
| <b>BGP-Static Advertisement Policy</b>    | Policies configured for the BGP group with the <b>advertise-bgp-static policy</b> statement.                                                                                                                                                           | <b>brief</b> none           |
| <b>Remove-private options</b>             | Options associated with the <b>remove-private</b> statement.                                                                                                                                                                                           | <b>brief detail</b><br>none |
| <b>Holdtime</b>                           | Maximum number of seconds allowed to elapse between successive keepalive or update messages that BGP receives from a peer in the BGP group, after which the connection to the peer is closed and routing devices through that peer become unavailable. | <b>brief detail</b><br>none |
| <b>Export</b>                             | Export policies configured for the BGP group with the <b>export</b> statement.                                                                                                                                                                         | <b>brief detail</b><br>none |
| <b>MED tracks IGP metric update delay</b> | Time, in seconds, that updates to multiple exit discriminator (MED) are delayed. Also displays the time remaining before the interval is set to expire                                                                                                 | All levels                  |
| <b>Traffic Statistics Interval</b>        | Time between sample periods for labeled-unicast traffic statistics, in seconds.                                                                                                                                                                        | <b>brief detail</b><br>none |

Table 77: show bgp group Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output             |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Total peers</b>                     | Total number of peers in the group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>brief detail</b><br>none |
| <b>Established</b>                     | Number of peers in the group that are in the established state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                  |
| <b>Active/Received/Accepted/Damped</b> | <p>Multipurpose field that displays information about BGP peer sessions. The field's contents depend upon whether a session is established and whether it was established in the main routing device or in a routing instance.</p> <ul style="list-style-type: none"> <li>If a peer is not established, the field shows the state of the peer session: <b>Active</b>, <b>Connect</b>, or <b>Idle</b>.</li> <li>If a BGP session is established in the main routing device, the field shows the number of active, received, accepted, and damped routes that are received from a neighbor and appear in the <b>inet.0</b> (main) and <b>inet.2</b> (multicast) routing tables. For example, <b>8/10/10/2</b> and <b>2/4/4/0</b> indicate the following: <ul style="list-style-type: none"> <li>8 active routes, 10 received routes, 10 accepted routes, and 2 damped routes from a BGP peer appear in the <b>inet.0</b> routing table.</li> <li>2 active routes, 4 received routes, 4 accepted routes, and no damped routes from a BGP peer appear in the <b>inet.2</b> routing table.</li> </ul> </li> </ul> | <b>summary</b>              |
| <b>ip-addresses</b>                    | List of peers who are members of the group. The address is followed by the peer's port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                  |
| <b>Route Queue Timer</b>               | Number of seconds until queued routes are sent. If this time has already elapsed, this field displays the number of seconds by which the updates are delayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail</b>               |
| <b>Route Queue</b>                     | Number of prefixes that are queued up for sending to the peers in the group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail</b>               |
| <b>inet.number</b>                     | <p>Number of active, received, accepted, and damped routes in the routing table. For example, <b>inet.0: 7/10/9/0</b> indicates the following:</p> <ul style="list-style-type: none"> <li>7 active routes, 10 received routes, 9 accepted routes, and no damped routes from a BGP peer appear in the <b>inet.0</b> routing table.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | none                        |

Table 77: show bgp group Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output     |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Table inet.number</b> | Information about the routing table. <ul style="list-style-type: none"> <li>• <b>Received prefixes</b>—Total number of prefixes from the peer, both active and inactive, that are in the routing table.</li> <li>• <b>Active prefixes</b>—Number of prefixes received from the peer that are active in the routing table.</li> <li>• <b>Suppressed due to damping</b>—Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols.</li> <li>• <b>Advertised prefixes</b>—Number of prefixes advertised to a peer.</li> <li>• <b>Received external prefixes</b>—Total number of prefixes from the external BGP (EBGP) peers, both active and inactive, that are in the routing table.</li> <li>• <b>Active external prefixes</b>—Number of prefixes received from the EBGP peers that are active in the routing table.</li> <li>• <b>Externals suppressed</b>—Number of routes received from EBGP peers currently inactive because of damping or other reasons.</li> <li>• <b>Received internal prefixes</b>—Total number of prefixes from the IBGP peers, both active and inactive, that are in the routing table.</li> <li>• <b>Active internal prefixes</b>—Number of prefixes received from the IBGP peers that are active in the routing table.</li> <li>• <b>Internals suppressed</b>—Number of routes received from IBGP peers currently inactive because of damping or other reasons.</li> <li>• <b>RIB State</b>—Status of the graceful restart process for this routing table: <b>BGP restart is complete</b>, <b>BGP restart in progress</b>, <b>VPN restart in progress</b>, or <b>VPN restart is complete</b>.</li> </ul> | <b>detail</b>       |
| <b>Groups</b>            | Total number of groups.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels          |
| <b>Peers</b>             | Total number of peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels          |
| <b>External</b>          | Total number of external peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels          |
| <b>Internal</b>          | Total number of internal peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels          |
| <b>Down peers</b>        | Total number of unavailable peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels          |
| <b>Flaps</b>             | Total number of flaps that occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels          |
| <b>Table</b>             | Name of a routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>brief</b> , none |
| <b>Tot Paths</b>         | Total number of routes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>brief</b> , none |
| <b>Act Paths</b>         | Number of active routes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>brief</b> , none |
| <b>Suppressed</b>        | Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>brief</b> , none |

Table 77: show bgp group Output Fields (*continued*)

| Field Name   | Field Description                                                                                                                                                                                           | Level of Output |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| History      | Number of withdrawn routes stored locally to keep track of damping history.                                                                                                                                 | brief, none     |
| Damp State   | Number of active routes with a figure of merit greater than zero, but lower than the threshold at which suppression occurs.                                                                                 | brief, none     |
| Pending      | Routes being processed by the BGP import policy.                                                                                                                                                            | brief, none     |
| Group        | Group the peer belongs to in the BGP configuration.                                                                                                                                                         | detail          |
| Receive mask | Mask of the received target included in the advertised route.                                                                                                                                               | detail          |
| Entries      | Number of route entries received.                                                                                                                                                                           | detail          |
| Target       | Route target that is to be passed by route-target filtering. If a route advertised from the provider edge (PE) routing device matches an entry in the route-target filter, the route is passed to the peer. | detail          |
| Mask         | Mask which specifies that the peer receive routes with the given route target.                                                                                                                              | detail          |

## Sample Output

### show bgp group

```
user@host> show bgp group
```

```

Groups: 2 Peers: 2 External: 1 Internal: 2 Down peers: 1 Flaps: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending

inet.0
 0 0 0 0 0 0

bgp.13vpn.0
 0 0 0 0 0 0

bgp.rtarget.0
 2 0 0 0 0 0

```

### show bgp group brief

```
user@host> show bgp group brief
```

```

Groups: 2 Peers: 2 External: 0 Internal: 2 Down peers: 1 Flaps: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending

inet.0
 0 0 0 0 0 0

bgp.13vpn.0
 0 0 0 0 0 0

```

```

bgp.rtarget.0
 2 0 0 0 0 0

```

### show bgp group detail

```

user@host> show bgp group detail
Group Type: Internal AS: 1 Local AS: 1
Name: ibgp Index: 0 Flags: <Export Eval>
Holdtime: 0
Total peers: 3 Established: 0
22.0.0.2
22.0.0.8
22.0.0.5

Groups: 1 Peers: 3 External: 0 Internal: 3 Down peers: 3 Flaps: 3
Table bgp.l3vpn.0
 Received prefixes: 0
 Accepted prefixes: 0
 Active prefixes: 0
 Suppressed due to damping: 0
 Received external prefixes: 0
 Active external prefixes: 0
 Externals suppressed: 0
 Received internal prefixes: 0
 Active internal prefixes: 0
 Internals suppressed: 0
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
Table bgp.mdt.0
 Received prefixes: 0
 Accepted prefixes: 0
 Active prefixes: 0
 Suppressed due to damping: 0
 Received external prefixes: 0
 Active external prefixes: 0
 Externals suppressed: 0
 Received internal prefixes: 0
 Active internal prefixes: 0
 Internals suppressed: 0
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
Table VPN-A.inet.0
 Received prefixes: 0
 Accepted prefixes: 0
 Active prefixes: 0
 Suppressed due to damping: 0
 Received external prefixes: 0
 Active external prefixes: 0
 Externals suppressed: 0
 Received internal prefixes: 0
 Active internal prefixes: 0
 Internals suppressed: 0
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
Table VPN-A.mdt.0
 Received prefixes: 0
 Accepted prefixes: 0
 Active prefixes: 0
 Suppressed due to damping: 0
 Received external prefixes: 0
 Active external prefixes: 0

```

```
Externals suppressed: 0
Received internal prefixes: 0
Active internal prefixes: 0
Internals suppressed: 0
RIB State: BGP restart is complete
RIB State: VPN restart is complete
```

#### show bgp group rtf detail

```
user@host> show bgp group rtf detail
Group: internal (group-index: 0)
 Receive mask: 00000002
 Table: bgp.rtarget.0
 Target Mask Entries: 2
 100:100/64 00000002
 200:201/64 (Group)
Group: internal (group-index: 1)
 Table: bgp.rtarget.0
 Target Mask Entries: 1
 200:201/64 (Group)
```

#### show bgp group summary

```
user@host> show bgp group summary
Group Type Peers Established Active/Received/Accepted/Damped
ibgp Internal 3 0
Groups: 1 Peers: 3 External: 0 Internal: 3 Down peers: 3 Flaps: 3
 bgp.l3vpn.0 : 0/0/0/0 External: 0/0/0/0 Internal: 0/0/0/0
 bgp.mdt.0 : 0/0/0/0 External: 0/0/0/0 Internal: 0/0/0/0
 VPN-A.inet.0 : 0/0/0/0 External: 0/0/0/0 Internal: 0/0/0/0
 VPN-A.mdt.0 : 0/0/0/0 External: 0/0/0/0 Internal: 0/0/0/0
```



## show bgp group traffic-statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show bgp group traffic-statistics<br><brief   detail><br><group-name><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Display the traffic statistics for configured Border Gateway Protocol (BGP) groups.                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>none</b>—Display traffic statistics for all BGP groups.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>group-name</b>—(Optional) Display BGP traffic statistics for only the specified group.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show bgp group traffic-statistics (Per-Group-Label Not Configured) on page 1408</a><br><a href="#">show bgp group traffic-statistics (Per-Group-Label Configured) on page 1408</a>                                                                                                                                                                                                                |
| <b>Output Fields</b>            | Table 78 on page 1407 describes the output fields for the <b>show bgp group traffic-statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                           |

**Table 78: show bgp group traffic-statistics Output Fields**

| Field Name         | Field Description                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Group name</b>  | Name of a specific BGP group.                                                                                    |
| <b>Group Index</b> | Index number for the BGP group.                                                                                  |
| <b>NLRI</b>        | Network layer reachability information (NLRI) indicating the source of the traffic statistics for the BGP group. |
| <b>FEC</b>         | Forwarding equivalence classes (FECs) associated with the BGP group.                                             |
| <b>Packets</b>     | Number of packets sent through each FEC.                                                                         |
| <b>Bytes</b>       | Number of bytes transmitted through each FEC.                                                                    |
| <b>EgressAS</b>    | Autonomous system (AS) number of the egress router.                                                              |
| <b>AdvLabel</b>    | Label associated with each FEC.                                                                                  |

## Sample Output

### show bgp group traffic-statistics (Per-Group-Label Not Configured)

```

user@host> show bgp group traffic-statistics
Group Name: ext1 Group Index: 0 NLRI: inet-labeled-unicast
FEC Packets Bytes EgressAS AdvLabel
10.255.245.55 0 0 I 100224
10.255.245.57 0 0 I 100240
100.101.0.0 550 48400 25 100256
100.102.0.0 550 48400 25 100256
100.103.0.0 550 48400 25 100272
100.104.0.0 550 48400 25 100272
192.168.25.0 0 0 I 100288

Group Name: ext2 Group Index: 1 NLRI: inet-labeled-unicast
FEC Packets Bytes EgressAS AdvLabel
10.255.245.55 0 0 I 100224
10.255.245.57 0 0 I 100240
100.101.0.0 550 48400 25 100256
100.102.0.0 550 48400 25 100256
100.103.0.0 550 48400 25 100272
100.104.0.0 550 48400 25 100272
192.168.25.0 0 0 I 100288

```

### show bgp group traffic-statistics (Per-Group-Label Configured)

```

user@host> show bgp group traffic-statistics
Group Name: ext1 Group Index: 0 NLRI: inet-labeled-unicast
FEC Packets Bytes EgressAS AdvLabel
10.255.245.55 0 0 I 100384
10.255.245.57 0 0 I 100400
100.101.0.0 101 8888 25 100416
100.102.0.0 101 8888 25 100416
100.103.0.0 0 0 25 100432
100.104.0.0 0 0 25 100432
192.168.25.0 0 0 I 100448

Group Name: ext2 Group Index: 1 NLRI: inet-labeled-unicast
FEC Packets Bytes EgressAS AdvLabel
10.255.245.55 0 0 I 100304
10.255.245.57 0 0 I 100320
100.101.0.0 0 0 25 100336
100.102.0.0 0 0 25 100336
100.103.0.0 101 8888 25 100352
100.104.0.0 101 8888 25 100352
192.168.25.0 0 0 I 100368

```

## show bgp neighbor

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                                        | <a href="#">Syntax on page 1409</a><br><a href="#">Syntax (EX Series Switch, QFX Series, and OCX Series) on page 1409</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                                                | <pre>show bgp neighbor &lt;exact-instance <i>instance-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor-address&gt; &lt;orf (detail   <i>neighbor-address</i>)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switch, QFX Series, and OCX Series)</b> | <pre>show bgp neighbor &lt;instance <i>instance-name</i>&gt; &lt;exact-instance <i>instance-name</i>&gt; &lt;neighbor-address&gt; &lt;orf (<i>neighbor-address</i>   detail)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                                   | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1x53-D20 for the OCX Series.</p> <p><b>orf</b> option introduced in Junos OS Release 9.2.</p> <p><b>exact-instance</b> option introduced in Junos OS Release 11.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                                           | Display information about BGP peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                               | <p><b>none</b>—Display information about all BGP peers.</p> <p><b>exact-instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about BGP peers for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show bgp neighbor instance cust1</b> command).</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor-address</b>—(Optional) Display information for only the BGP peer at the specified IP address.</p> <p><b>orf (detail   <i>neighbor-address</i>)</b>—(Optional) Display outbound route-filtering information for all BGP peers or only for the BGP peer at the specified IP address. The default is to display brief output. Use the <b>detail</b> option to display detailed output.</p> |
| <b>Additional Information</b>                                | For information about the <b>local-address</b> , <b>nlri</b> , <b>hold-time</b> , and <b>preference</b> statements, see the <i>Junos OS Routing Protocols Library for Routing Devices</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b>                              | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Related Documentation** • [clear bgp neighbor on page 1393](#)

**List of Sample Output** [show bgp neighbor on page 1417](#)  
[show bgp neighbor \(CLNS\) on page 1418](#)  
[show bgp neighbor \(Layer 2 VPN\) on page 1419](#)  
[show bgp neighbor \(Layer 3 VPN\) \(Not supported on the OCX Series.\) on page 1421](#)  
[show bgp neighbor neighbor-address on page 1422](#)  
[show bgp neighbor neighbor-address on page 1422](#)  
[show bgp neighbor neighbor-address \(BGP Graceful Restart Enabled\) on page 1423](#)  
[show bgp neighbor neighbor-address \(BGP Long-Lived Graceful Restart\) on page 1424](#)  
[show bgp neighbor orf neighbor-address detail on page 1424](#)

**Output Fields** [Table 79 on page 1410](#) describes the output fields for the **show bgp neighbor** command. Output fields are listed in the approximate order in which they appear.

**Table 79: show bgp neighbor Output Fields**

| Field Name   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peer</b>  | Address of the BGP neighbor. The address is followed by the neighbor port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>AS</b>    | AS number of the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Local</b> | Address of the local routing device. The address is followed by the peer port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Type</b>  | Type of peer: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>State</b> | Current state of the BGP session: <ul style="list-style-type: none"> <li>• <b>Active</b>—BGP is initiating a transport protocol connection in an attempt to connect to a peer. If the connection is successful, BGP sends an Open message.</li> <li>• <b>Connect</b>—BGP is waiting for the transport protocol connection to be completed.</li> <li>• <b>Established</b>—The BGP session has been established, and the peers are exchanging update messages.</li> <li>• <b>Idle</b>—This is the first stage of a connection. BGP is waiting for a Start event.</li> <li>• <b>OpenConfirm</b>—BGP has acknowledged receipt of an open message from the peer and is waiting to receive a keepalive or notification message.</li> <li>• <b>OpenSent</b>—BGP has sent an open message and is waiting to receive an open message from the peer.</li> <li>• <b>route reflector client</b>—The BGP session is established with a route reflector client.</li> </ul> |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flags</b>      | <p>Internal BGP flags:</p> <ul style="list-style-type: none"> <li>• <b>Aggregate Label</b>—BGP has aggregated a set of incoming labels (labels received from the peer) into a single forwarding label.</li> <li>• <b>CleanUp</b>—The peer session is being shut down.</li> <li>• <b>Delete</b>—This peer has been deleted.</li> <li>• <b>Idled</b>—This peer has been permanently idled.</li> <li>• <b>ImportEval</b>—At the last commit operation, this peer was identified as needing to reevaluate all received routes.</li> <li>• <b>Initializing</b>—The peer session is initializing.</li> <li>• <b>SendRtn</b>—Messages are being sent to the peer.</li> <li>• <b>Sync</b>—This peer is synchronized with the rest of the peer group.</li> <li>• <b>RSync</b>—This peer in the backup Routing Engine is synchronized with the BGP peer in the master Routing Engine for nonstop active routing.</li> <li>• <b>TryConnect</b>—Another attempt is being made to connect to the peer.</li> <li>• <b>Unconfigured</b>—This peer is not configured.</li> <li>• <b>WriteFailed</b>—An attempt to write to this peer failed.</li> </ul>                                                                                                       |
| <b>Last state</b> | <p>Previous state of the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—BGP is initiating a transport protocol connection in an attempt to connect to a peer. If the connection is successful, BGP sends an Open message.</li> <li>• <b>Connect</b>—BGP is waiting for the transport protocol connection to be completed.</li> <li>• <b>Established</b>—The BGP session has been established, and the peers are exchanging update messages.</li> <li>• <b>Idle</b>—This is the first stage of a connection. BGP is waiting for a Start event.</li> <li>• <b>OpenConfirm</b>—BGP has acknowledged receipt of an open message from the peer and is waiting to receive a keepalive or notification message.</li> <li>• <b>OpenSent</b>—BGP has sent an open message and is waiting to receive an open message from the peer.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Last event</b> | <p>Last activity that occurred in the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Closed</b>—The BGP session closed.</li> <li>• <b>ConnectRetry</b>—The transport protocol connection failed, and BGP is trying again to connect.</li> <li>• <b>HoldTime</b>—The session ended because the hold timer expired.</li> <li>• <b>KeepAlive</b>—The local routing device sent a BGP keepalive message to the peer.</li> <li>• <b>Open</b>—The local routing device sent a BGP open message to the peer.</li> <li>• <b>OpenFail</b>—The local routing device did not receive an acknowledgment of a BGP open message from the peer.</li> <li>• <b>RecvKeepAlive</b>—The local routing device received a BGP keepalive message from the peer.</li> <li>• <b>RecvNotify</b>—The local routing device received a BGP notification message from the peer.</li> <li>• <b>RecvOpen</b>—The local routing device received a BGP open message from the peer.</li> <li>• <b>RecvUpdate</b>—The local routing device received a BGP update message from the peer.</li> <li>• <b>Start</b>—The peering session started.</li> <li>• <b>Stop</b>—The peering session stopped.</li> <li>• <b>TransportError</b>—A TCP error occurred.</li> </ul> |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Last error                                                     | <p>Last error that occurred in the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Cease</b>—An error occurred, such as a version mismatch, that caused the session to close.</li> <li>• <b>Finite State Machine Error</b>—In setting up the session, BGP received a message that it did not understand.</li> <li>• <b>Hold Time Expired</b>—The session's hold time expired.</li> <li>• <b>Message Header Error</b>—The header of a BGP message was malformed.</li> <li>• <b>Open Message Error</b>—A BGP open message contained an error.</li> <li>• <b>None</b>—No errors occurred in the BGP session.</li> <li>• <b>Update Message Error</b>—A BGP update message contained an error.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Export                                                         | Name of the export policy that is configured on the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Import                                                         | Name of the import policy that is configured on the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Options                                                        | <p>Configured BGP options:</p> <ul style="list-style-type: none"> <li>• <b>AddressFamily</b>—Configured address family: <b>inet</b> or <b>inet-vpn</b>.</li> <li>• <b>AdvertiseBGPStatic</b>—Configured BGP static routes are advertised.</li> <li>• <b>AuthKeyChain</b>—Authentication key change is enabled.</li> <li>• <b>DropPathAttributes</b>—Certain path attributes are configured to be dropped from neighbor updates during inbound processing.</li> <li>• <b>GracefulRestart</b>—Graceful restart is configured.</li> <li>• <b>HoldTime</b>—Hold time configured with the <b>hold-time</b> statement. The hold time is three times the interval at which keepalive messages are sent.</li> <li>• <b>IgnorePathAttributes</b>—Certain path attributes are configured to be ignored in neighbor updates during inbound processing.</li> <li>• <b>Local Address</b>—Address configured with the <b>local-address</b> statement.</li> <li>• <b>LLGR</b>—BGP long-lived graceful restart capability is configured.</li> <li>• <b>LLGRHelperDisabled</b>—BGP long-lived graceful restart is completely disabled for a neighbor.</li> <li>• <b>Multihop</b>—Allow BGP connections to external peers that are not on a directly connected network.</li> <li>• <b>NLRI</b>—Configured MBGP state for the BGP group: <b>multicast</b>, <b>unicast</b>, or both if you have configured <b>nlri any</b>.</li> <li>• <b>Peer AS</b>—Configured peer autonomous system (AS).</li> <li>• <b>Preference</b>—Preference value configured with the <b>preference</b> statement.</li> <li>• <b>Refresh</b>—Configured to refresh automatically when the policy changes.</li> <li>• <b>Rib-group</b>—Configured routing table group.</li> </ul> |
| Path-attributes dropped                                        | Path attribute codes that are dropped from neighbor updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Path-attributes ignored                                        | Path attribute codes that are ignored during neighbor updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Peer does not support LLGR Restarter or Receiver functionality | BGP neighbor does not support long-lived graceful restart (LLGR) restarter mode completely.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                                         | Field Description                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Peer does not support LLGR Restarter functionality | BGP neighbor does not support long-lived graceful restart (LLGR) restarter mode for any family.                                                                                                                                                                                                                                                                                 |
| Authentication key change                          | (appears only if the <b>authentication-keychain</b> statement has been configured) Name of the authentication keychain enabled.                                                                                                                                                                                                                                                 |
| Authentication algorithm                           | (appears only if the <b>authentication-algorithm</b> statement has been configured) Type of authentication algorithm enabled: <b>hmac</b> or <b>md5</b> .                                                                                                                                                                                                                       |
| Address families configured                        | Names of configured address families for the VPN.                                                                                                                                                                                                                                                                                                                               |
| BGP-Static Advertisement Policy                    | Name of the bgp static policy that is configured on the peer.                                                                                                                                                                                                                                                                                                                   |
| Local Address                                      | Address of the local routing device.                                                                                                                                                                                                                                                                                                                                            |
| Remove-private options                             | Options associated with the <b>remove-private</b> statement.                                                                                                                                                                                                                                                                                                                    |
| Holdtime                                           | Hold time configured with the <b>hold-time</b> statement. The hold time is three times the interval at which keepalive messages are sent.                                                                                                                                                                                                                                       |
| Flags for NLRI inet-label-unicast                  | Flags related to labeled-unicast: <ul style="list-style-type: none"> <li>• <b>TrafficStatistics</b>—Collection of statistics for labeled-unicast traffic is enabled.</li> </ul>                                                                                                                                                                                                 |
| Traffic statistics                                 | Information about labeled-unicast traffic statistics: <ul style="list-style-type: none"> <li>• <b>Options</b>—Options configured for collecting statistics about labeled-unicast traffic.</li> <li>• <b>File</b>—Name and location of statistics log files.</li> <li>• <b>size</b>—Size of all the log files, in bytes.</li> <li>• <b>files</b>—Number of log files.</li> </ul> |
| Traffic Statistics Interval                        | Time between sample periods for labeled-unicast traffic statistics, in seconds.                                                                                                                                                                                                                                                                                                 |
| Preference                                         | Preference value configured with the <b>preference</b> statement.                                                                                                                                                                                                                                                                                                               |
| Outbound Timer                                     | Time for which the route is available in Junos OS routing table before it is exported to BGP. This field is displayed in the output only if the <b>out-delay</b> parameter is configured to a non-zero value.                                                                                                                                                                   |
| Number of flaps                                    | Number of times the BGP session has gone down and then come back up.                                                                                                                                                                                                                                                                                                            |
| Peer ID                                            | Router identifier of the peer.                                                                                                                                                                                                                                                                                                                                                  |
| Group index                                        | Index number for the BGP peer group. The index number differentiates between groups when a single BGP group is split because of different configuration options at the group and peer levels.                                                                                                                                                                                   |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Peer index                                                     | Index that is unique within the BGP group to which the peer belongs.                                                                                                                                                                                                                                                                                                                                                                                  |
| Local ID                                                       | Router identifier of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                        |
| Local Interface                                                | Name of the interface on the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Active holdtime                                                | Hold time that the local routing device negotiated with the peer.                                                                                                                                                                                                                                                                                                                                                                                     |
| Keepalive Interval                                             | Keepalive interval, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| BFD                                                            | Status of BFD failure detection.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Local Address                                                  | Name of directly connected interface over which direct EBGp peering is established.                                                                                                                                                                                                                                                                                                                                                                   |
| NLRI and times for LLGR configured on peer                     | <p>Names of address families and stale time for BGP long-lived graceful restart configured on the BGP peer or neighbor.</p> <p>Times are displayed using the routing protocol daemon (rpd) %#OT format:</p> <p><b>&lt;weeks&gt;w&lt;days&gt;d &lt;hours&gt;:&lt;minutes&gt;:&lt;seconds&gt;</b></p> <p>Zero leading elements are omitted, for example, a value less than one week do not include the weeks.</p>                                       |
| NLRI and times that peer supports LLGR Restarter for           | <p>Names of address families and stale time that the BGP peer supports for restarter mode for BGP long-lived graceful restart.</p> <p>Times are displayed using the routing protocol daemon (rpd) %#OT format:</p> <p><b>&lt;weeks&gt;w&lt;days&gt;d &lt;hours&gt;:&lt;minutes&gt;:&lt;seconds&gt;</b></p> <p>Zero leading elements are omitted, for example, a value less than one week do not include the weeks.</p>                                |
| NLRI that peer saved LLGR forwarding for                       | Name of the address family for which the BGP peer saved BGP long-lived graceful restart forwarding.                                                                                                                                                                                                                                                                                                                                                   |
| Graceful Restart Details                                       | Amount of time that is remaining until LLGR expires and the time remaining on the GR stale timer, along with RIB details, are displayed while LLGR receiver mode is active (a peer that negotiated LLGR has disconnected and not yet reconnected)                                                                                                                                                                                                     |
| NLRI we are holding stale routes for                           | Names of address families (NLRIs) for which that stale routes are held or preserved when BGP graceful restart receiver mode is active for a neighbor.                                                                                                                                                                                                                                                                                                 |
| Time until end-of-rib is assumed for stale routes              | <p>Amount of time remaining on the stale timer until which end-of-RIB (EoR) markers are assumed when BGP graceful restart receiver mode is active for a neighbor.</p> <p>Time is displayed in Coordinated Universal Time (UTC) format (YYYY-MM-DD-HH:MM:SS). Note that the stale timer display ('Time until end-of-rib is assumed') is also present when a session is active, but the neighbor as not yet sent all of the end-of-rib indications.</p> |
| Time until stale routes are deleted or become long-lived stale | Amount of time up to which stale routes are deleted or become long-lived stale routes when BGP graceful restart receiver mode is active for a neighbor.                                                                                                                                                                                                                                                                                               |



Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                           |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NLRI for restart configured on peer           | Names of address families configured for restart.                                                                                                                                                           |
| NLRI advertised by peer                       | Address families supported by the peer: <b>unicast</b> or <b>multicast</b> .                                                                                                                                |
| NLRI for this session                         | Address families being used for this session.                                                                                                                                                               |
| Peer supports Refresh capability              | Remote peer's ability to send and request full route table readvertisement (route refresh capability). For more information, see RFC 2918, <i>Route Refresh Capability for BGP-4</i> .                      |
| Restart time configured on peer               | Configured time allowed for restart on the neighbor.                                                                                                                                                        |
| Stale routes from peer are kept for           | When graceful restart is negotiated, the maximum time allowed to hold routes from neighbors after the BGP session has gone down.                                                                            |
| Peer does not support Restarter functionality | Graceful restart restarter-mode is disabled on the peer.                                                                                                                                                    |
| Peer does not support Receiver functionality  | Graceful restart helper-mode is disabled on the peer.                                                                                                                                                       |
| Restart time requested by this peer           | Restart time requested by this neighbor during capability negotiation.                                                                                                                                      |
| Restart flag received from the peer           | When this field appears, the BGP speaker has restarted (Restarting), and this peer should not wait for the <b>end-of-rib</b> marker from the speaker before advertising routing information to the speaker. |
| NLRI that peer supports restart for           | Neighbor supports graceful restart for this address family.                                                                                                                                                 |
| NLRI peer can save forwarding state           | Neighbor supporting this address family saves all forwarding states.                                                                                                                                        |
| NLRI that peer saved forwarding for           | Neighbor saves all forwarding states for this address family.                                                                                                                                               |
| NLRI that restart is negotiated for           | Router supports graceful restart for this address family.                                                                                                                                                   |
| NLRI of received end-of-rib markers           | Address families for which end-of-routing-table markers are received from the neighbor.                                                                                                                     |
| NLRI of all end-of-rib markers sent           | Address families for which end-of-routing-table markers are sent to the neighbor.                                                                                                                           |
| Peer supports 4 byte AS extension (peer-as 1) | Peer understands 4-byte AS numbers in BGP messages. The peer is running Junos OS Release 9.1 or later.                                                                                                      |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                                                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NLRIs for which peer can receive multiple paths            | <p>Appears in the command output of the local router if the downstream peer is configured to receive multiple BGP routes to a single destination, instead of only receiving the active route.</p> <p>Possible value is <b>inet-unicast</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| NLRIs for which peer can send multiple paths: inet-unicast | <p>Appears in the command output of the local router if the upstream peer is configured to send multiple BGP routes to a single destination, instead of only sending the active route.</p> <p>Possible value is <b>inet-unicast</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Table inet.number                                          | <p>Information about the routing table:</p> <ul style="list-style-type: none"> <li>• <b>RIB State</b>—BGP is in the graceful restart process for this routing table: <b>restart is complete</b> or <b>restart in progress</b>.</li> <li>• <b>Bit</b>—Number that represents the entry in the routing table for this peer.</li> <li>• <b>Send state</b>—State of the BGP group: <b>in sync</b>, <b>not in sync</b>, or <b>not advertising</b>.</li> <li>• <b>Active prefixes</b>—Number of prefixes received from the peer that are active in the routing table.</li> <li>• <b>Received prefixes</b>—Total number of prefixes from the peer, both active and inactive, that are in the routing table.</li> <li>• <b>Accepted prefixes</b>—Total number of prefixes from the peer that have been accepted by a routing policy.</li> <li>• <b>Suppressed due to damping</b>—Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols.</li> </ul> |
| Last traffic (seconds)                                     | Last time any traffic was received from the peer or sent to the peer, and the last time the local routing device checked.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input messages                                             | Messages that BGP has received from the receive socket buffer, showing the total number of messages, number of update messages, number of times a policy is changed and refreshed, and the buffer size in octets. The buffer size is 16 KB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Output messages                                            | Messages that BGP has written to the transmit socket buffer, showing the total number of messages, number of update messages, number of times a policy is changed and refreshed, and the buffer size in octets. The buffer size is 16 KB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input dropped path attributes                              | <p>Information about dropped path attributes:</p> <ul style="list-style-type: none"> <li>• <b>Code</b>—Path attribute code.</li> <li>• <b>Count</b>—Path attribute count.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Input ignored path attributes                              | <p>Information about ignored path attributes:</p> <ul style="list-style-type: none"> <li>• <b>Code</b>—Path attribute code.</li> <li>• <b>Count</b>—Path attribute count.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 79: show bgp neighbor Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Output queue</b>            | <p>Number of BGP packets that are queued to be transmitted to a particular neighbor for a particular routing table. Output queue <b>0</b> is for unicast NLRIs, and queue <b>1</b> is for multicast NLRIs.</p> <p>It also specifies the routing table name and the NLRI that the table was advertised through, in the format (<i>routing table name, NLRI</i>).</p> <p><b>NOTE:</b> The output queue of routing tables that are not advertised, will only show up at <b>extensive</b> output level.</p> |
| <b>Trace options</b>           | Configured tracing of BGP protocol packets and operations.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Trace file</b>              | Name of the file to receive the output of the tracing operation.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Filter Updates rcv</b>      | <p>(<b>orf</b> option only) Number of outbound-route filters received for each configured address family.</p> <p><b>NOTE:</b> The counter is cumulative. For example, the counter is increased after the remote peer either resends or clears the outbound route filtering prefix list.</p>                                                                                                                                                                                                             |
| <b>Immediate</b>               | <p>(<b>orf</b> option only) Number of route updates received with the immediate flag set. The immediate flag indicates that the BGP peer should readvertise the updated routes.</p> <p><b>NOTE:</b> The counter is cumulative. For example, the counter is increased after the remote peer either resends or clears the outbound route filtering prefix list.</p>                                                                                                                                       |
| <b>Filter</b>                  | ( <b>orf</b> option only) Type of prefix filter received: <b>prefix-based</b> or <b>extended-community</b> .                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Received filter entries</b> | ( <b>orf</b> option only) List of received filters displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>seq</b>                     | ( <b>orf</b> option only) Numerical order assigned to this prefix entry among all the received outbound route filter prefix entries.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>prefix</b>                  | ( <b>orf</b> option only) Address for the prefix entry that matches the filter.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>minlength</b>               | ( <b>orf</b> option only) Minimum prefix length, in bits, required to match this prefix.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>maxlength</b>               | ( <b>orf</b> option only) Maximum prefix length, in bits, required to match this prefix.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>match</b>                   | ( <b>orf</b> option only) For this prefix match, whether to <b>permit</b> or <b>deny</b> route updates.                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### show bgp neighbor

```

user@host > show bgp neighbor
Peer: 10.255.7.250+179 AS 10 Local: 10.255.7.248+63740 AS 10
 Type: Internal State: Established Flags: <Sync>
 Last State: OpenConfirm Last Event: RecvKeepAlive
 Last Error: None
 Export: [redistrib_static]
 Options: <Preference LocalAddress PeerAS Refresh>
 Options: <AdvertiseBGPStatic>

```

```

Local Address: 10.255.7.248 Holdtime: 90 Preference: 170 Outbound Timer: 50
Number of flaps: 0
Peer ID: 10.255.7.250 Local ID: 10.255.7.248 Active Holdtime: 90
Keepalive Interval: 30 Group index: 0 Peer index: 0
BFD: disabled, down
NLRI for restart configured on peer: inet-unicast
NLRI advertised by peer: inet-unicast
NLRI for this session: inet-unicast
Peer supports Refresh capability (2)
Stale routes from peer are kept for: 300
Peer does not support Restarter functionality
NLRI that restart is negotiated for: inet-unicast
NLRI of received end-of-rib markers: inet-unicast
NLRI of all end-of-rib markers sent: inet-unicast
Peer supports 4 byte AS extension (peer-as 10)
Peer does not support Addpath
Table inet.0 Bit: 10000
 RIB State: BGP restart is complete
 Send state: in sync
 Active prefixes: 1
 Received prefixes: 1
 Accepted prefixes: 1
 Suppressed due to damping: 0
 Advertised prefixes: 1
Last traffic (seconds): Received 9 Sent 5 Checked 5
Input messages: Total 36 Updates 2 Refreshes 0 Octets 718
Output messages: Total 37 Updates 1 Refreshes 0 Octets 796
Output Queue[0]: 0 (inet.0, inet-unicast)

Peer: 10.255.162.214+52193 AS 100 Local: 10.255.167.205+179 AS 100
 Type: Internal State: Established (route reflector client)Flags: <Sync>
 Last State: OpenConfirm Last Event: RecvKeepAlive
 Last Error: None
 Options: <Preference LocalAddress Cluster AddressFamily Rib-group Refresh>
 Address families configured: inet-unicast inet-vpn-unicast route-target
 Local Address: 10.255.167.205 Holdtime: 90 Preference: 170
 Number of flaps: 0
 Peer ID: 10.255.162.214 Local ID: 10.255.167.205 Active Holdtime: 90
 Keepalive Interval: 30 Group index: 0 Peer index: 1

```

### show bgp neighbor (CLNS)

```

user@host> show bgp neighbor
Peer: 10.245.245.1+179 AS 200 Local: 10.245.245.3+3770 AS 100
 Type: External State: Established Flags: <ImportEval Sync>
 Last State: OpenConfirm Last Event: RecvKeepAlive
 Last Error: None
 Options: <Multihop Preference LocalAddress HoldTime AddressFamily PeerAS
 Rib-group Refresh>
 Address families configured: iso-vpn-unicast
 Local Address: 10.245.245.3 Holdtime: 90 Preference: 170
 Number of flaps: 0
 Peer ID: 10.245.245.1 Local ID: 10.245.245.3 Active Holdtime: 90
 Keepalive Interval: 30 Peer index: 0
 NLRI advertised by peer: iso-vpn-unicast
 NLRI for this session: iso-vpn-unicast
 Peer supports Refresh capability (2)
Table bgp.isovpn.0 Bit: 10000
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
 Send state: in sync
 Active prefixes: 3

```

```

Received prefixes: 3
Suppressed due to damping: 0
Advertised prefixes: 3
Table aaaa.iso.0
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: not advertising
Active prefixes: 3
Received prefixes: 3
Suppressed due to damping: 0
Last traffic (seconds): Received 6 Sent 5 Checked 5
Input messages: Total 1736 Updates 4 Refreshes 0 Octets 33385
Output messages: Total 1738 Updates 3 Refreshes 0 Octets 33305
Output Queue[0]: 0 (bgp.isovpn.0, iso-vpn-unicast)
Output Queue[1]: 0 (aaaa.iso.0, iso-vpn-unicast)

```

### show bgp neighbor (Layer 2 VPN)

```

user@host> show bgp neighbor
Peer: 10.69.103.2 AS 65100 Local: 10.69.103.1 AS 65103
Type: External State: Active Flags: <ImportEval>
Last State: Idle Last Event: Start
Last Error: None
Export: [BGP-INET-import]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily PeerAS
Refresh>
Address families configured: inet-unicast
Local Address: 10.69.103.1 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer: 10.69.104.2 AS 65100 Local: 10.69.104.1 AS 65104
Type: External State: Active Flags: <ImportEval>
Last State: Idle Last Event: Start
Last Error: None
Export: [BGP-L-import]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily PeerAS
Refresh>
Address families configured: inet-labeled-unicast
Local Address: 10.69.104.1 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer: 10.255.14.182+179 AS 69 Local: 10.255.14.176+2131 AS 69
Type: Internal State: Established Flags: <ImportEval>
Last State: OpenConfirm Last Event: RecvKeepAlive
Last Error: None
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily
Rib-group Refresh>
Address families configured: inet-vpn-unicast l2vpn
Local Address: 10.255.14.176 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer ID: 10.255.14.182 Local ID: 10.255.14.176 Active Holdtime: 90
Keepalive Interval: 30
NLRI for restart configured on peer: inet-vpn-unicast l2vpn
NLRI advertised by peer: inet-vpn-unicast l2vpn
NLRI for this session: inet-vpn-unicast l2vpn
Peer supports Refresh capability (2)
Restart time configured on the peer: 120
Stale routes from peer are kept for: 300
Restart time requested by this peer: 120
NLRI that peer supports restart for: inet-vpn-unicast l2vpn
NLRI peer can save forwarding state: inet-vpn-unicast l2vpn
NLRI that peer saved forwarding for: inet-vpn-unicast l2vpn
NLRI that restart is negotiated for: inet-vpn-unicast l2vpn

```

NLRI of received end-of-rib markers: inet-vpn-unicast l2vpn

Table bgp.l3vpn.0 Bit: 10000

RIB State: BGP restart in progress

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 10

Received prefixes: 10

Suppressed due to damping: 0

Table bgp.l2vpn.0 Bit: 20000

RIB State: BGP restart in progress

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 1

Received prefixes: 1

Suppressed due to damping: 0

Table BGP-INET.inet.0 Bit: 30000

RIB State: BGP restart in progress

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 2

Received prefixes: 2

Suppressed due to damping: 0

Table BGP-L.inet.0 Bit: 40000

RIB State: BGP restart in progress

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 2

Received prefixes: 2

Suppressed due to damping: 0

Table LDP.inet.0 Bit: 50000

RIB State: BGP restart is complete

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 1

Received prefixes: 1

Suppressed due to damping: 0

Table OSPF.inet.0 Bit: 60000

RIB State: BGP restart is complete

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 2

Received prefixes: 2

Suppressed due to damping: 0

Table RIP.inet.0 Bit: 70000

RIB State: BGP restart is complete

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 2

Received prefixes: 2

Suppressed due to damping: 0

Table STATIC.inet.0 Bit: 80000

RIB State: BGP restart is complete

RIB State: VPN restart in progress

Send state: in sync

Active prefixes: 1

Received prefixes: 1

Suppressed due to damping: 0

Table L2VPN.l2vpn.0 Bit: 90000

RIB State: BGP restart is complete

RIB State: VPN restart in progress

Send state: in sync

```

Active prefixes: 1
Received prefixes: 1
Suppressed due to damping: 0
Last traffic (seconds): Received 0 Sent 0 Checked 0
Input messages: Total 14 Updates 13 Refreshes 0 Octets 1053
Output messages: Total 3 Updates 0 Refreshes 0 Octets 105
Output Queue[0]: 0 (bgp.l3vpn.0, inet-vpn-unicast)
Output Queue[1]: 0 (bgp.l2vpn.0, inet-vpn-unicast)
Output Queue[2]: 0 (BGP-INET.inet.0, inet-vpn-unicast)
Output Queue[3]: 0 (BGP-L.inet.0, inet-vpn-unicast)
Output Queue[4]: 0 (LDP.inet.0, inet-vpn-unicast)
Output Queue[5]: 0 (OSPF.inet.0, inet-vpn-unicast)
Output Queue[6]: 0 (RIP.inet.0, inet-vpn-unicast)
Output Queue[7]: 0 (STATIC.inet.0, inet-vpn-unicast)
Output Queue[8]: 0 (L2VPN.l2vpn.0, inet-vpn-unicast)

```

### show bgp neighbor (Layer 3 VPN) (Not supported on the OCX Series.)

```

user@host> show bgp neighbor
Peer: 4.4.4.4+179 AS 10045 Local: 5.5.5.5+1214 AS 10045
Type: Internal State: Established Flags: <ImportEval>
Last State: OpenConfirm Last Event: RecvKeepAlive
Last Error: None
Export: [match-all] Import: [match-all]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily
Rib-group Refresh>
Address families configured: inet-vpn-unicast
Local Address: 5.5.5.5 Holdtime: 90 Preference: 170
Flags for NLRI inet-labeled-unicast: TrafficStatistics
Traffic Statistics: Options: all File: /var/log/bstat.log
 size 131072 files 10

Traffic Statistics Interval: 60
Number of flaps: 0
Peer ID: 192.168.1.110 Local ID: 192.168.1.111 Active Holdtime: 90
Keepalive Interval: 30
NLRI for restart configured on peer: inet-vpn-unicast
NLRI advertised by peer: inet-vpn-unicast
NLRI for this session: inet-vpn-unicast
Peer supports Refresh capability (2)
Restart time configured on the peer: 120
Stale routes from peer are kept for: 300
Restart time requested by this peer: 120
NLRI that peer supports restart for: inet-vpn-unicast
NLRI peer can save forwarding state: inet-vpn-unicast
NLRI that peer saved forwarding for: inet-vpn-unicast
NLRI that restart is negotiated for: inet-vpn-unicast
NLRI of received end-of-rib markers: inet-vpn-unicast
NLRI of all end-of-rib markers sent: inet-vpn-unicast
Table bgp.l3vpn.0 Bit: 10000
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
 Send state: in sync
 Active prefixes: 2
 Received prefixes: 2
 Suppressed due to damping: 0
Table vpn-green.inet.0 Bit: 20001
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete
 Send state: in sync
 Active prefixes: 2
 Received prefixes: 2

```

```

 Suppressed due to damping: 0
 Last traffic (seconds): Received 15 Sent 20 Checked 20
 Input messages: Total 40 Updates 2 Refreshes 0 Octets 856
 Output messages: Total 44 Updates 2 Refreshes 0 Octets 1066
 Output Queue[0]: 0 (bgp.l3vpn.0, inet-vpn-unicast)
 Output Queue[1]: 0 (vpn-green.inet.0, inet-vpn-unicast)
 Trace options: detail packets
 Trace file: /var/log/bgpgr.log size 131072 files 10

```

### show bgp neighbor neighbor-address

```

user@host> show bgp neighbor 192.168.1.111
Peer: 10.255.245.12+179 AS 35 Local: 10.255.245.13+2884 AS 35
 Type: Internal State: Established (route reflector client)Flags: <Sync>
 Last State: OpenConfirm Last Event: RecvKeepAlive
 Last Error: None
 Options: <Preference LocalAddress HoldTime Cluster AddressFamily Rib-group
Refresh>
 Address families configured: inet-vpn-unicast inet-labeled-unicast
 Local Address: 10.255.245.13 Holdtime: 90 Preference: 170
 Flags for NLRI inet-vpn-unicast: AggregateLabel
 Flags for NLRI inet-labeled-unicast: AggregateLabel
 Number of flaps: 0
 Peer ID: 10.255.245.12 Local ID: 10.255.245.13 Active Holdtime: 90
 Keepalive Interval: 30
 BFD: disabled
 NLRI advertised by peer: inet-vpn-unicast inet-labeled-unicast
 NLRI for this session: inet-vpn-unicast inet-labeled-unicast
 Peer supports Refresh capability (2)
 Restart time configured on the peer: 300
 Stale routes from peer are kept for: 60
 Restart time requested by this peer: 300
 NLRI that peer supports restart for: inet-unicast inet6-unicast
 NLRI that restart is negotiated for: inet-unicast inet6-unicast
 NLRI of received end-of-rib markers: inet-unicast inet6-unicast
 NLRI of all end-of-rib markers sent: inet-unicast inet6-unicast
 Table inet.0 Bit: 10000
 RIB State: restart is complete
 Send state: in sync
 Active prefixes: 4
 Received prefixes: 6
 Suppressed due to damping: 0
 Table inet6.0 Bit: 20000
 RIB State: restart is complete
 Send state: in sync
 Active prefixes: 0
 Received prefixes: 2
 Suppressed due to damping: 0
 Last traffic (seconds): Received 3 Sent 3 Checked 3
 Input messages: Total 9 Updates 6 Refreshes 0 Octets 403
 Output messages: Total 7 Updates 3 Refreshes 0 Octets 365
 Output Queue[0]: 0 (inet.0, inet-unicast)
 Output Queue[1]: 0 (inet6.0, inet6-unicast)
 Trace options: detail packets
 Trace file: /var/log/bgpgr size 131072 files 10

```

### show bgp neighbor neighbor-address

```

user@host> show bgp neighbor 192.168.4.222
Peer: 192.168.4.222+4902 AS 65501 Local: 192.168.4.221+179 AS 65500
 Type: External State: Established Flags: <Sync>

```



```

Last State: OpenConfirm Last Event: RecvKeepAlive
Last Error: Cease
Export: [export-policy] Import: [import-policy]
Options: <Preference HoldTime AddressFamily PeerAS PrefixLimit Refresh>
Address families configured: inet-unicast inet-multicast
Holdtime: 60000 Preference: 170
Number of flaps: 4
Last flap event: RecvUpdate
Error: 'Cease' Sent: 5 Recv: 0
Peer ID: 10.255.245.6 Local ID: 10.255.245.5 Active Holdtime: 60000
Keepalive Interval: 20000 Peer index: 0
BFD: disabled, down
Local Interface: fxp0.0
NLRI advertised by peer: inet-unicast inet-multicast
NLRI for this session: inet-unicast inet-multicast
Peer supports Refresh capability (2)
Table inet.0 Bit: 10000
 RIB State: BGP restart is complete
 Send state: in sync
 Active prefixes: 8
 Received prefixes: 10
 Accepted prefixes: 10
 Suppressed due to damping: 0
 Advertised prefixes: 3
Table inet.2 Bit: 20000
 RIB State: BGP restart is complete
 Send state: in sync
 Active prefixes: 0
 Received prefixes: 0
 Accepted prefixes: 0
 Suppressed due to damping: 0
 Advertised prefixes: 0
Last traffic (seconds): Received 357 Sent 357 Checked 357
Input messages: Total 4 Updates 2 Refreshes 0 Octets 211
Output messages: Total 4 Updates 1 Refreshes 0 Octets 147
Output Queue[0]: 0 (inet.0, inet-unicast)
Output Queue[1]: 0 (inet.2, inet-multicast)
Trace options: all
Trace file: /var/log/bgp size 10485760 files 10

```

### show bgp neighbor neighbor-address (BGP Graceful Restart Enabled)

```
user@router> show bgp neighbor 10.255.255.16
```

```

Peer: 10.255.255.16 AS 100 Local: 10.255.255.12 AS 100
Type: Internal State: Active Flags: <>
Last State: Idle Last Event: Start
Last Error: None
Options: <Preference LocalAddress AddressFamily Rib-group Refresh>
Options: <LLGR>
Address families configured: 12vpn
Local Address: 10.255.255.12 Holdtime: 90 Preference: 170
NLRI 12vpn:
Number of flaps: 6
Last flap event: Restart
NLRI we are holding stale routes for: inet-vpn-unicast
Time until stale routes are deleted or become long-lived stale: 00:01:57
Time until end-of-rib is assumed for stale routes: 00:04:43
Table bgp.12vpn.0
 RIB State: BGP restart is complete
 RIB State: VPN restart is complete

```

```

Send state: not advertising
Active prefixes: 0
Received prefixes: 7
Accepted prefixes: 7
Suppressed due to damping: 0
Table foo.inet.0 Bit: 30000
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: not in sync
Active prefixes: 0
Received prefixes: 7
Accepted prefixes: 7
Suppressed due to damping: 0

```

### show bgp neighbor neighbor-address (BGP Long-Lived Graceful Restart)

```

user@router> show bgp neighbor 10.4.12.11

Peer: 10.4.12.11 AS 100 Local: 10.6.128.225 AS 100
Type: Internal State: Active Flags: <>
Last State: Idle Last Event: Start
Last Error: None
Export: [foo]
Options: <Preference LocalAddress Refresh GracefulRestart>
Options: <LLGR>
Local Address: 10.6.128.225 Holdtime: 90 Preference: 170
Number of flaps: 3
Last flap event: Restart
Error: 'Cease' Sent: 0 Recv: 1
Time until long-lived stale routes deleted: inet-vpn-unicast 10:00:22
route-target 10:00:22
Table bgp.l3vpn.0
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: not advertising
Active prefixes: 0
Received prefixes: 7
Accepted prefixes: 7
Suppressed due to damping: 0
Table foo.inet.0 Bit: 30000
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: not in sync
Active prefixes: 0
Received prefixes: 7
Accepted prefixes: 7
Suppressed due to damping: 0

```

### show bgp neighbor orf neighbor-address detail

```

user@host > show bgp neighbor orf 192.168.165.56 detail
Peer: 192.168.165.56+179 Type: External
Group: ext1

inet-unicast
Filter updates rcv: 1 Immediate: 1
Filter: prefix-based receive
Received filter entries:
seq 1: prefix 2.2.2.2/32: minlen 32: maxlen 32: match deny:

inet6-unicast

```

```
Filter updates rcv: 0 Immediate: 1
Filter: prefix-based receive
Received filter entries:
:
```

## show bgp replication

|                                 |                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show bgp replication</b>                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                     |
| <b>Description</b>              | Displays the status of BGP state replication between the master and backup Routing Engines on devices that have nonstop active routing configured on them.                         |
| <b>Options</b>                  | This command has no options.                                                                                                                                                       |
| <b>Required Privilege Level</b> | view                                                                                                                                                                               |
| <b>List of Sample Output</b>    | <a href="#">show bgp replication (for Master) on page 1427</a><br><a href="#">show bgp replication (for Backup) on page 1427</a>                                                   |
| <b>Output Fields</b>            | <a href="#">Table 80 on page 1426</a> lists the output fields for the <b>show bgp replication</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 80: show bgp replication Output Fields**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>session state</b>           | State of the current internal BGP state replication session, Up or Down, and the duration for which the session has been in the indicated state.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>flaps</b>                   | Total number of flaps that occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>protocol state</b>          | Current state of the protocol operation, Active, Connect, Idle, and the duration for which the protocol has been in the indicated state.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>synchronization state</b>   | Synchronization state at the time of executing the command. The states can be: <ul style="list-style-type: none"> <li>• <b>Idle</b></li> <li>• <b>Neighbor</b>—Indicates that the neighbor state synchronization is in progress.</li> <li>• <b>AckWait</b>—Indicates that the request processing is over.</li> <li>• <b>ORF</b>—Indicates that the outbound routing filter synchronization is in progress.</li> <li>• <b>RIB</b>—Indicates that the routing table synchronization is in progress.</li> <li>• <b>Complete</b></li> </ul> |
| <b>number of peers waiting</b> | Total number of peers waiting for various messages: <ul style="list-style-type: none"> <li>• <b>AckWait</b>—Number of peers waiting for a connection establishment or completed acknowledgment messages.</li> <li>• <b>SoWait</b>—Number of peers waiting for TCP socket-related operations.</li> <li>• <b>Scheduled</b>—Number of peers being synchronized.</li> </ul>                                                                                                                                                                 |

Table 80: show bgp replication Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>messages sent</b>     | <p>Number of various types of messages that have been sent since internal replication session became active:</p> <ul style="list-style-type: none"> <li>• <b>Open</b>—Number of Open messages sent.</li> <li>• <b>Establish</b>—Number of connection establishment acknowledgment messages sent.</li> <li>• <b>Update</b>—Number of update messages sent.</li> <li>• <b>Error</b>—Number of error messages sent.</li> <li>• <b>Complete</b>—Number of connection complete acknowledgment messages sent.</li> </ul>                                                                                                                               |
| <b>messages received</b> | <p>Total number of messages received:</p> <ul style="list-style-type: none"> <li>• <b>Open</b>—Number of Open messages received.</li> <li>• <b>Request</b>—Number of request messages received: <ul style="list-style-type: none"> <li>• <b>Wildcard</b>—Number of requests received that used wildcards in the target address.</li> <li>• <b>Targeted</b>—Number of requests received that used a specific address.</li> </ul> </li> <li>• <b>EstablishAck</b>—Number of connection establishment acknowledgement messages received.</li> <li>• <b>CompleteAck</b>—Number of connection completed acknowledgement messages received.</li> </ul> |

## Sample Output

### show bgp replication (for Master)

```

user@host> show bgp replication
Synchronization master:
 Session state: Up, Since: 44:07
 Flaps: 0
 Protocol state: Idle, Since: 14
 Synchronization state: Complete
 Number of peers waiting: AckWait: 0, SoWait: 0, Scheduled: 0
 Messages sent: Open 1, Establish 924, Update 381, Error 60, Complete 114
 Messages received: Open 1, Request 1 wildcard 113 targeted, EstablishAck 924,
 CompleteAck 114

```

### show bgp replication (for Backup)

```

user@host> show bgp replication
Synchronization backup:
 State: Established 13 ago
 , Unsync timer: 2

 Unsync entry queue:
 Instance: 0 Neighbor: 30.30.30.1 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.3 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.4 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.5 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.6 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.1 elapsed: 7
 Instance: 0 Neighbor: 40.40.40.2 elapsed: 7

```

## show bgp summary

---

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1428</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1428</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                   | <pre>show bgp summary &lt;exact-instance <i>instance-name</i>&gt; &lt;group <i>group-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show bgp summary &lt;exact-instance <i>instance-name</i>&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br><b>exact-instance</b> option introduced in Junos OS Release 11.4.<br><b>group</b> option introduced in Junos OS Release 13.3.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                              | Display BGP summary information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                  | <p><b>none</b>—Display BGP summary information for all routing instances.</p> <p><b>exact-instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>group</b>—Display overview of bgp information for a particular group</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show bgp summary instance cust1</b> command). The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                    | <a href="#">show bgp summary (When a Peer Is Not Established) on page 1431</a><br><a href="#">show bgp summary (When a Peer Is Established) on page 1431</a><br><a href="#">show bgp summary (CLNS) on page 1431</a><br><a href="#">show bgp summary (Layer 2 VPN) on page 1432</a><br><a href="#">show bgp summary (Layer 3 VPN) on page 1432</a><br><a href="#">show bgp summary group on page 1432</a><br><a href="#">show bgp summary (BGP Graceful Restart or Long-Lived Graceful Restart) on page 1433</a>                                                                                                                                                                                                                                                                                                                                 |

**Output Fields** Table 81 on page 1429 describes the output fields for the **show bgp summary** command. Output fields are listed in the approximate order in which they appear.

**Table 81: show bgp summary Output Fields**

| Field Name          | Field Description                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Groups</b>       | Number of BGP groups.                                                                                                                                                  |
| <b>Peers</b>        | Number of BGP peers.                                                                                                                                                   |
| <b>Down peers</b>   | Number of down BGP peers.                                                                                                                                              |
| <b>Table</b>        | Name of routing table.                                                                                                                                                 |
| <b>Tot Paths</b>    | Total number of paths.                                                                                                                                                 |
| <b>Act Paths</b>    | Number of active routes.                                                                                                                                               |
| <b>Suppressed</b>   | Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols. |
| <b>History</b>      | Number of withdrawn routes stored locally to keep track of damping history.                                                                                            |
| <b>Damp State</b>   | Number of routes with a figure of merit greater than zero, but still active because the value has not reached the threshold at which suppression occurs.               |
| <b>Pending</b>      | Routes in process by BGP import policy.                                                                                                                                |
| <b>Peer</b>         | Address of each BGP peer. Each peer has one line of output.                                                                                                            |
| <b>AS</b>           | Peer's AS number.                                                                                                                                                      |
| <b>InPkt</b>        | Number of packets received from the peer.                                                                                                                              |
| <b>OutPkt</b>       | Number of packets sent to the peer.                                                                                                                                    |
| <b>OutQ</b>         | Number of BGP packets that are queued to be transmitted to a particular neighbor. It normally is 0 because the queue usually is emptied quickly.                       |
| <b>Flaps</b>        | Number of times the BGP session has gone down and then come back up.                                                                                                   |
| <b>Last Up/Down</b> | Last time since the neighbor transitioned to or from the established state.                                                                                            |

Table 81: show bgp summary Output Fields (*continued*)

| Field Name                                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>State #Active<br/>/Received/Accepted<br/>/Damped</b> | <p>Multipurpose field that displays information about BGP peer sessions. The field's contents depend upon whether a session is established and whether it was established on the main routing device or in a routing instance.</p> <ul style="list-style-type: none"> <li>If a peer is not established, the field shows the state of the peer session: <b>Active</b>, <b>Connect</b>, or <b>Idle</b>. In general, the Idle state is the first stage of a connection. BGP is waiting for a Start event. A session can be idle for other reasons as well. The reason that a session is idle is sometimes displayed. For example: <b>Idle (Removal in progress)</b> or <b>Idle (LicenseFailure)</b>.</li> <li>If a BGP session is established on the main routing device, the field shows the number of active, received, accepted, and damped routes that are received from a neighbor and appear in the <b>inet.0</b> (main) and <b>inet.2</b> (multicast) routing tables. For example, <b>8/10/10/2</b> and <b>2/4/4/0</b> indicate the following: <ul style="list-style-type: none"> <li>8 active routes, 10 received routes, 10 accepted routes, and 2 damped routes from a BGP peer appear in the <b>inet.0</b> routing table.</li> <li>2 active routes, 4 received routes, 4 accepted routes, and no damped routes from a BGP peer appear in the <b>inet.2</b> routing table.</li> </ul> </li> <li>If a BGP session is established in a routing instance, the field indicates the established (<b>Establ</b>) state, identifies the specific routing table that receives BGP updates, and shows the number of active, received, and damped routes that are received from a neighbor. For example, <b>Establ VPN-AB.inet.0: 2/4/0</b> indicates the following: <ul style="list-style-type: none"> <li>The BGP session is established.</li> <li>Routes are received in the <b>VPN-AB.inet.0</b> routing table.</li> <li>The local routing device has two active routes, four received routes, and no damped routes from a BGP peer.</li> </ul> </li> </ul> <p>When a BGP session is established, the peers are exchanging update messages.</p> <p><b>NOTE:</b> When graceful restart or LLGR helper mode is active, the RIB information is now displayed by the <b>show bgp summary</b> command. If a BGP session is established on the main routing device, the field shows the number of active, received, accepted, and damped routes that are received from a neighbor and appear in the inet.0 (main) and inet.2 (multicast) routing tables. For example, 8/10/10/2 and 2/4/4/0 indicate the following:</p> <ul style="list-style-type: none"> <li>8 active routes, 10 received routes, 10 accepted routes, and 2 damped routes from a BGP peer appear in the inet.0 routing table.</li> <li>2 active routes, 4 received routes, 4 accepted routes, and no damped routes from a BGP peer appear in the inet.2 routing table.</li> </ul> |



## Sample Output

### show bgp summary (When a Peer Is Not Established)

```

user@host> show bgp summary
Groups: 2 Peers: 4 Down peers: 1
Table Tot Paths Act Paths Suppressed History Damp State Pending
inet.0 6 4 0 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Damped...
10.0.0.3 65002 86 90 0 2 42:54 0/0/0

0/0/0
10.0.0.4 65002 90 91 0 1 42:54 0/2/0

0/0/0
10.0.0.6 65002 87 90 0 3 3 Active
10.1.12.1 65001 89 89 0 1 42:54 4/4/0

0/0/0

```

### show bgp summary (When a Peer Is Established)

```

user@host> show bgp summary
Groups: 1 Peers: 3 Down peers: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending
inet.0 6 4 0 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Damped...
10.0.0.2 65002 88675 88652 0 2 42:38 2/4/0

0/0/0
10.0.0.3 65002 54528 54532 0 1 2w4d22h 0/0/0

0/0/0
10.0.0.4 65002 51597 51584 0 0 2w3d22h 2/2/0

0/0/0

user@host> show bgp summary logical-system R3
Groups: 2 Peers: 2 Down peers: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending
bgp.13vpn.0 2 2 0 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Accepted/Damped...
1.1.1.2 2 204 206 0 0 1:30:59
Establ
 bgp.13vpn.0: 2/2/2/0
 red.inet.0: 2/2/2/0
10.1.1.10 3 206 207 0 0 1:31:36
Establ
 red.inet.0: 2/2/2/0

```

### show bgp summary (CLNS)

```

user@host> show bgp summary
Groups: 1 Peers: 1 Down peers: 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Damped...
10.245.245.1 200 1735 1737 0 0 14:26:12 Establ

```

```

bgp.isovpn.0: 3/3/0
aaaa.iso.0: 3/3/0

```

### show bgp summary (Layer 2 VPN)

```

user@host> show bgp summary
Groups: 1 Peers: 5 Down peers: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending
bgp.l2vpn.0 1 1 0 0 0 0
inet.0 0 0 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Damped...
10.255.245.35 65299 72 74 0 1 19:00 Establ
bgp.l2vpn.0: 1/1/0
frame-vpn.l2vpn.0: 1/1/0
10.255.245.36 65299 2164 2423 0 4 19:50 Establ
bgp.l2vpn.0: 0/0/0
frame-vpn.l2vpn.0: 0/0/0
10.255.245.37 65299 36 37 0 4 17:07 Establ
inet.0: 0/0/0
10.255.245.39 65299 138 168 0 6 53:48 Establ
bgp.l2vpn.0: 0/0/0
frame-vpn.l2vpn.0: 0/0/0
10.255.245.69 65299 134 140 0 6 53:42 Establ
inet.0: 0/0/0

```

### show bgp summary (Layer 3 VPN)

```

user@host> show bgp summary
Groups: 2 Peers: 2 Down peers: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending
bgp.l3vpn.0 2 2 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Damped...
10.39.1.5 2 21 22 0 0 6:26 Establ
VPN-AB.inet.0: 1/1/0
10.255.71.15 1 19 21 0 0 6:17 Establ
bgp.l3vpn.0: 2/2/0
VPN-A.inet.0: 1/1/0
VPN-AB.inet.0: 2/2/0
VPN-B.inet.0: 1/1/0

```

### show bgp summary group

```

user@host> show bgp summary group Group2
Groups: 3 Peers: 3 Down peers: 3
Table Tot Paths Act Paths Suppressed History Damp State Pending
inet.0 0 0 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Accepted/Damped...
10.0.0.1 56 0 0 0 0 51
Idle

user@host> show bgp summary logical-system R3 group toR4
Groups: 2 Peers: 2 Down peers: 0
Table Tot Paths Act Paths Suppressed History Damp State Pending
bgp.l3vpn.0 2 2 0 0 0 0
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Accepted/Damped...
10.1.1.10 3 207 207 0 0 1:31:40

```

```
Estab1
red.inet.0: 2/2/2/0
```

### show bgp summary (BGP Graceful Restart or Long-Lived Graceful Restart)

```
user@router> show route receive-protocol bgp 10.4.12.11 detail
Groups: 2 Peers: 9 Down peers: 1
...
Peer AS InPkt OutPkt OutQ Flaps Last Up/Dwn
State|#Active/Received/Accepted/Damped...
10.255.255.16 100 7 6 0 4 4
Idle
 bgp.13vpn.0: 0/7/7/0
 foo.inet.0: 0/7/7/0
```

## show policy damping

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1434</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1434</a>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                   | <pre>show policy damping &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show policy damping                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                              |
| <b>Description</b>                              | Display information about BGP route flap damping parameters.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                  | <p><b>none</b>—Display information about BGP route flap damping parameters.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                          |
| <b>Additional Information</b>                   | In the output from this command, figure-of-merit values correlate with the probability of future instability of a routing device. Routes with higher figure-of-merit values are suppressed for longer periods of time. The figure-of-merit value decays exponentially over time. A figure-of-merit value of zero is assigned to each new route. The value is increased each time the route is withdrawn or readvertised, or when one of its path attributes changes. |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li>• <a href="#">clear bgp damping on page 1392</a></li> <li>• <a href="#">show route damping on page 1882</a></li> </ul>                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>                    | <a href="#">show policy damping on page 1435</a>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>                            | <p><a href="#">Table 82 on page 1434</a> describes the output fields for the <b>show policy damping</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                         |

**Table 82: show policy damping Output Fields**

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Halflife</b> | Decay half-life, in minutes. The value represents the period during which the accumulated figure-of-merit value is reduced by half if the route remains stable. If a route has flapped, but then becomes stable, the figure-of-merit value for the route decays exponentially. For example, for a route with a figure-of-merit value of 1500, if no incidents occur, its figure-of-merit value is reduced to 750 after 15 minutes and to 375 after another 15 minutes. |

Table 82: show policy damping Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reuse merit</b>           | Figure-of-merit value below which a suppressed route can be used again. A suppressed route becomes reusable when its figure-of-merit value decays to a value below a reuse threshold, and the route once again is considered usable and can be installed in the forwarding table and exported from the routing table.                                                                                        |
| <b>Suppress/cutoff merit</b> | Figure-of-merit value above which a route is suppressed for use or inclusion in advertisements. When a route's figure-of-merit value reaches a particular level, called the cutoff or suppression threshold, the route is suppressed. When a route is suppressed, the routing table no longer installs the route into the forwarding table and no longer exports this route to any of the routing protocols. |
| <b>Maximum suppress time</b> | Maximum hold-down time, in minutes. The value represents the maximum time that a route can be suppressed no matter how unstable it has been before this period of stability.                                                                                                                                                                                                                                 |
| <b>Computed values</b>       | <ul style="list-style-type: none"> <li>• <b>Merit ceiling</b>—Maximum merit that a flapping route can collect.</li> <li>• <b>Maximum decay</b>—Maximum decay half-life, in minutes.</li> </ul>                                                                                                                                                                                                               |

## Sample Output

### show policy damping

```

user@host> show policy damping
Default damping information:
 Halflife: 15 minutes
 Reuse merit: 750 Suppress/cutoff merit: 3000
 Maximum suppress time: 60 minutes
 Computed values:
 Merit ceiling: 12110
 Maximum decay: 6193
Damping information for "standard-damping":
 Halflife: 10 minutes
 Reuse merit: 4000 Suppress/cutoff merit: 8000
 Maximum suppress time: 30 minutes
 Computed values:
 Merit ceiling: 32120
 Maximum decay: 12453

```



## CHAPTER 18

# ES-IS Operational Commands

- `clear esis adjacency`
- `clear esis statistics`
- `show esis adjacency`
- `show esis interface`
- `show esis statistics`

## clear esis adjacency

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear esis adjacency</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;neighbor&gt;</code>                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Clear End System-to-Intermediate System (ES-IS) adjacencies.                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b>none</b> —Clear all ES-IS adjacencies.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear adjacencies for the specified routing instance only.<br><br><b>interface <i>interface-name</i></b> —(Optional) Clear adjacencies for the specified interface only.<br><br><b>neighbor</b> —(Optional) Clear adjacencies for the specified neighbor only. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show esis adjacency on page 1440</a></li></ul>                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>    | <a href="#">clear esis adjacency on page 1438</a>                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                            |

## Sample Output

### clear esis adjacency

```
user@host> clear esis adjacency
```



## clear esis statistics

---

|                                 |                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear esis statistics<br><instance <i>instance-name</i> >                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                      |
| <b>Description</b>              | Clear End System-to-Intermediate System (ES-IS) packet statistics.                                                                                                                                   |
| <b>Options</b>                  | <b>none</b> —Clear ES-IS packet statistics for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear ES-IS packet statistics for the specified routing instance only. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show esis statistics on page 1444</a></li></ul>                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">clear esis statistics on page 1439</a>                                                                                                                                                   |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                |

## Sample Output

### clear esis statistics

```
user@host> clear esis statistics
```

## show esis adjacency

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show esis adjacency<br><brief   detail   extensive><br><esis-neighbor-id><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Display End System-to-Intermediate System (ES-IS) adjacencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>brief</b>) Display all ES-IS adjacencies.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>esis-neighbor-id</b>—(Optional) Display adjacencies for the specified neighbor's network service access point (NSAP) only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display adjacencies for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display adjacencies for the specified interface only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear esis adjacency on page 1438</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show esis adjacency on page 1441</a><br><a href="#">show esis adjacency brief on page 1441</a><br><a href="#">show esis adjacency detail on page 1441</a><br><a href="#">show esis adjacency extensive on page 1441</a>                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | <p><a href="#">Table 83 on page 1440</a> describes the output fields for the <b>show esis adjacency</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                |

**Table 83: show esis adjacency Output Fields**

| Field Name         | Field Description                                             | Level of Output                |
|--------------------|---------------------------------------------------------------|--------------------------------|
| <b>Nbr Type</b>    | Type of network service access point (NSAP) of this neighbor. | <b>brief</b> none              |
| <b>NSAP/NET</b>    | NSAP of this neighbor.                                        | All levels                     |
| <b>Type</b>        | Type of NSAP of this neighbor.                                | <b>detail</b> <b>extensive</b> |
| <b>Hold (secs)</b> | Holdtime interval advertised by this neighbor.                | <b>brief</b> none              |
| <b>Interface</b>   | Interface through which the neighbor is reachable.            | All levels                     |

Table 83: show esis adjacency Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Advertised holdtime | Holdtime interval advertised by this neighbor.                                                                                                                                                                                                                                                                                                                                                  | detail extensive |
| Expires in          | How long until the adjacency expires, in seconds.                                                                                                                                                                                                                                                                                                                                               | detail extensive |
| SNPA                | Subnetwork point of attachment (MAC address of the neighbor).                                                                                                                                                                                                                                                                                                                                   | detail extensive |
| Transition log      | List of recent transitions. <ul style="list-style-type: none"> <li>• <b>When</b>—Time of advertisement from this neighbor.</li> <li>• <b>State</b>—State of the adjacency: <b>Up</b>, <b>Down</b>, <b>New</b>, <b>One-way</b>, <b>Initializing</b>, or <b>Rejected</b>.</li> <li>• <b>Event</b>—Event causing the state.</li> <li>• <b>Down reason</b>—Reason the adjacency is down.</li> </ul> | extensive        |

## Sample Output

### show esis adjacency

```

user@host> show esis adjacency
Nbr NSAP/NET Hold Interface
Type (secs)
IS 47.0005.80ff.f800.0000.0108.0001.0102.5501.6008 135 fe-0/0/0.0

```

### show esis adjacency brief

The output for the **show esis adjacency brief** command is identical to that for the **show esis adjacency** command. For sample output, see [show esis adjacency on page 1441](#).

### show esis adjacency detail

```

user@host> show esis adjacency detail
NSAP/NET: 47.0005.80ff.f800.0000.0108.0001.0102.5501.6008, Type: IS
Interface: fe-0/0/0.0, Advertised hold time: 180 secs, Expires in: 173 secs
SNPA: 0:5:85:c1:73:71

```

### show esis adjacency extensive

```

user@host> show esis adjacency extensive
NSAP/NET: 47.0005.80ff.f800.0000.0108.0001.0102.5501.6008, Type: IS
Interface: fe-0/0/0.0, Advertised hold time: 180 secs, Expires in: 167 secs
SNPA: 0:5:85:c1:73:71
Transition log:
When State Event Down reason
Sun Nov 26 22:07:35 Up Received ISH

```

## show esis interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show esis interface<br><brief   detail   extensive><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display End System-to-Intermediate System (ES-IS) interface information.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>brief</b>) Display information for all configured ES-IS interfaces.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display configured interfaces for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display information about the specified interface only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show esis interface on page 1443</a><br><a href="#">show esis interface brief on page 1443</a><br><a href="#">show esis interface detail on page 1443</a><br><a href="#">show esis interface extensive on page 1443</a>                                                                                                                                                                                                          |
| <b>Output Fields</b>            | Table 84 on page 1442 describes the output fields for the <b>show esis interface</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                        |

**Table 84: show esis interface Output Fields**

| Field Name                    | Field Description                                    | Level of Output  |
|-------------------------------|------------------------------------------------------|------------------|
| <b>Interface</b>              | Interface through which the adjacency is made.       | All levels       |
| <b>Receives</b>               | Types of hello messages that are received.           | All levels       |
| <b>Sends</b>                  | Types of hello messages that are sent.               | All levels       |
| <b>Hello interval</b>         | Interface's hello interval, in seconds.              | All levels       |
| <b>Adjacencies or Num Adj</b> | Number of adjacencies established on this interface. | All levels       |
| <b>Holdtime</b>               | Interface's hold time, in seconds.                   | detail extensive |
| <b>State</b>                  | Internal implementation information.                 | detail extensive |

Table 84: show esis interface Output Fields (*continued*)

| Field Name                     | Field Description                                                   | Level of Output  |
|--------------------------------|---------------------------------------------------------------------|------------------|
| End system configuration timer | Time, in seconds, for the end system to configure itself for ES-IS. | detail extensive |
| Interface index                | Index value.                                                        | detail extensive |
| NET used in hello              | Network entity title used in hello messages.                        | detail extensive |

## Sample Output

### show esis interface

```
user@host> show esis interface
Interface Receives Sends Hello Interval Num Adj
fe-0/0/0.0 ISH ISH 60.00 1
lo0.0 ISH - 60.00 0
```

### show esis interface brief

The output for the **show esis interface brief** command is identical to that for the **show esis interface** command. For sample output, see [show esis interface on page 1443](#).

### show esis interface detail

```
user@host> show esis interface detail
Interface: fe-0/0/0.0
 Receives: ISH, Sends: ISH, Hello interval: 60.00
 Adjacencies: 1, Holdtime: 180, End system configuration timer: 180
 Interface index: 68, State: 0x2
 NET used in hello: 47.0005.80ff.f800.0000.0108.0001.0102.5501.6007

Interface: lo0.0
 Receives: ISH, Sends: - , Hello interval: 60.00
 Adjacencies: 0, Holdtime: 180, End system configuration timer: 180
 Interface index: 64, State: 0x2
 NET used in hello: 47.0005.80ff.f800.0000.0108.0001.0102.5501.6007
```

### show esis interface extensive

The output for the **show esis interface extensive** command is identical to that for the **show esis interface detail** command. For sample output, see [show esis interface detail on page 1443](#).

## show esis statistics

|                                 |                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show esis statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                        |
| <b>Description</b>              | Display End System-to-Intermediate System (ES-IS) packet statistics.                                                                                                                                   |
| <b>Options</b>                  | <p><b>none</b>—Display ES-IS packet statistics for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display ES-IS statistics for the specified routing instance only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear esis statistics on page 1439</a></li> </ul>                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show esis statistics on page 1444</a>                                                                                                                                                      |
| <b>Output Fields</b>            | <a href="#">Table 85 on page 1444</a> describes the output fields for the <b>show esis statistics</b> command. Output fields are listed in the approximate order in which they appear.                 |

**Table 85: show esis statistics Output Fields**

| Field Name                         | Field Description                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>PDU type</b>                    | Protocol data unit type.                                                                                    |
| <b>Received</b>                    | Number of PDUs received since IS-IS started or since the statistics were set to zero.                       |
| <b>Processed</b>                   | Number of PDUs received less the number dropped.                                                            |
| <b>Drops</b>                       | Number of PDUs dropped.                                                                                     |
| <b>Sent</b>                        | Number of PDUs transmitted since IS-IS started or since the statistics were set to zero.                    |
| <b>Total packets received/sent</b> | Total number of PDUs received and transmitted since IS-IS started or since the statistics were set to zero. |

## Sample Output

### show esis statistics

```

user@host> show esis statistics
PDU type Received Processed Drops Sent
ESH 3 3 0 8
ISH 11 10 1 4
RD 0 0 0 0

```

|                                    |    |    |   |    |
|------------------------------------|----|----|---|----|
| Unknown                            | 0  | 0  | 0 | 0  |
| Totals                             | 14 | 13 | 1 | 12 |
| Total packets received: 14 sent: 0 |    |    |   |    |





## CHAPTER 19

# IP Multicast Operational Commands

- clear amt statistics
- clear amt tunnel
- clear igmp membership
- clear igmp snooping membership
- clear igmp snooping statistics
- clear igmp statistics
- clear mld membership
- clear mld statistics
- clear msdp cache
- clear msdp statistics
- clear multicast bandwidth-admission
- clear multicast forwarding-cache
- clear multicast scope
- clear multicast sessions
- clear multicast snooping statistics
- clear multicast statistics
- clear pim join
- clear pim join-distribution
- clear pim register
- clear pim snooping join
- clear pim snooping statistics
- clear pim statistics
- request pim multicast-tunnel rebalance
- show amt statistics
- show amt summary
- show amt tunnel
- show dvmrp interfaces
- show dvmrp neighbors

- `show dvmrp prefix`
- `show dvmrp prunes`
- `show igmp group`
- `show igmp interface`
- `show igmp snooping interface`
- `show igmp snooping membership`
- `show igmp snooping statistics`
- `show igmp statistics`
- `show mld group`
- `show mld interface`
- `show mld statistics`
- `show msdp`
- `show msdp source`
- `show msdp source-active`
- `show msdp statistics`
- `show multicast backup-pe-groups`
- `show multicast flow-map`
- `show multicast forwarding-cache statistics`
- `show multicast interface`
- `show multicast mrinfo`
- `show multicast next-hops`
- `show multicast pim-to-igmp-proxy`
- `show multicast pim-to-mld-proxy`
- `show multicast route`
- `show multicast rpf`
- `show multicast scope`
- `show multicast snooping next-hops`
- `show multicast sessions`
- `show multicast snooping route`
- `show multicast statistics`
- `show multicast usage`
- `show pim bootstrap`
- `show pim interfaces`
- `show pim join`
- `show pim mdt`
- `show pim mdt data-mdt-joins`
- `show pim mdt data-mdt-limit`

- `show pim neighbors`
- `show pim rps`
- `show pim snooping interfaces`
- `show pim snooping join`
- `show pim snooping neighbors`
- `show pim snooping statistics`
- `show pim source`
- `show pim statistics`
- `show sap listen`
- `test msdp`

## clear amt statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear amt statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Clear Automatic Multicast Tunneling (AMT) statistics.                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <b>none</b> —Clear the multicast statistics for all AMT tunnel interfaces.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear AMT multicast statistics for the specified instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show amt statistics on page 1484</a></li></ul>                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">clear amt statistics on page 1450</a>                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                      |

## Sample Output

### clear amt statistics

```
user@host> clear amt statistics
```

## clear amt tunnel

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>clear amt tunnel &lt;gateway <i>gateway-ip-addr</i>&gt; &lt;port <i>port-number</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;statistics&gt; &lt;tunnel-interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Clear the Automatic Multicast Tunneling (AMT) multicast state. Optionally, clear AMT protocol statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—Clear multicast state for all AMT tunnel interfaces.</p> <p><b>gateway <i>gateway-ip-addr</i> port <i>port-number</i></b>—(Optional) Clear the AMT multicast state for the specified gateway address. If no port is specified, clear the AMT multicast state for all AMT gateways with the given IP address.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear the AMT multicast state for the specified instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>statistics</b>—(Optional) Clear multicast statistics for all AMT tunnels or for specified tunnels.</p> <p><b>tunnel-interface <i>interface-name</i></b>—(Optional) Clear the AMT multicast state for the specified AMT tunnel interface.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show amt tunnel on page 1489</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">clear amt tunnel on page 1451</a><br><a href="#">clear amt tunnel statistics gateway-address on page 1451</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### clear amt tunnel

```
user@host> clear amt tunnel
```

### clear amt tunnel statistics gateway-address

```
user@host> clear amt tunnel statistics gateway-address 100.31.1.21 port 4000
```

## clear igmp membership

---

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                               | <a href="#">Syntax on page 1452</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1452</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Syntax                                       | <pre>clear igmp membership &lt;group address-range&gt; &lt;interface interface-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Syntax (EX Series Switch and the QFX Series) | <pre>clear igmp membership &lt;group address-range&gt; &lt;interface interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Release Information                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                       |
| Description                                  | Clear Internet Group Management Protocol (IGMP) group members.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Options                                      | <p><b>none</b>—Clear all IGMP members on all interfaces and for all address ranges.</p> <p><b>group address-range</b>—(Optional) Clear all IGMP members that are in a particular address range. An example of a range is <b>224.2/16</b>. If you omit the destination prefix length, the default is <b>/32</b>.</p> <p><b>interface interface-name</b>—(Optional) Clear all IGMP group members on an interface.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| Required Privilege Level                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Related Documentation                        | <ul style="list-style-type: none"><li>• <a href="#">show igmp group on page 1500</a></li><li>• <a href="#">show igmp interface on page 1504</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
| List of Sample Output                        | <a href="#">clear igmp membership on page 1452</a><br><a href="#">clear igmp membership interface on page 1453</a><br><a href="#">clear igmp membership group on page 1454</a>                                                                                                                                                                                                                                                                                                                                                                                           |
| Output Fields                                | See <a href="#">show igmp group</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### clear igmp membership

The following sample output displays IGMP group information before and after the **clear igmp membership** command is entered:

```

user@host> show igmp group
Interface Group Last Reported Timeout
so-0/0/0 224.2.127.253 10.1.128.1 186
so-0/0/0 224.2.127.254 10.1.128.1 186
so-0/0/0 239.255.255.255 10.1.128.1 187
so-0/0/0 224.1.127.255 10.1.128.1 188
local 224.0.0.6 (null) 0
local 224.0.0.5 (null) 0
local 224.2.127.254 (null) 0
local 239.255.255.255 (null) 0
local 224.0.0.2 (null) 0
local 224.0.0.13 (null) 0

```

```

user@host> clear igmp membership
Clearing Group Membership Info for so-0/0/0
Clearing Group Membership Info for so-1/0/0
Clearing Group Membership Info for so-2/0/0

```

```

user@host> show igmp group
Interface Group Last Reported Timeout
local 224.0.0.6 (null) 0
local 224.0.0.5 (null) 0
local 224.2.127.254 (null) 0
local 239.255.255.255 (null) 0
local 224.0.0.2 (null) 0
local 224.0.0.13 (null) 0

```

### clear igmp membership interface

The following sample output displays IGMP group information before and after the **clear igmp membership interface** command is issued:

```

user@host> show igmp group
Interface Group Last Reported Timeout
so-0/0/0 224.2.127.253 10.1.128.1 210
so-0/0/0 239.255.255.255 10.1.128.1 210
so-0/0/0 224.1.127.255 10.1.128.1 215
so-0/0/0 224.2.127.254 10.1.128.1 216
local 224.0.0.6 (null) 0
local 224.0.0.5 (null) 0
local 224.2.127.254 (null) 0
local 239.255.255.255 (null) 0
local 224.0.0.2 (null) 0
local 224.0.0.13 (null) 0

```

```

user@host> clear igmp membership interface so-0/0/0
Clearing Group Membership Info for so-0/0/0

```

```

user@host> show igmp group
Interface Group Last Reported Timeout
local 224.0.0.6 (null) 0
local 224.0.0.5 (null) 0
local 224.2.127.254 (null) 0
local 239.255.255.255 (null) 0
local 224.0.0.2 (null) 0
local 224.0.0.13 (null) 0

```

## clear igmp membership group

The following sample output displays IGMP group information before and after the **clear igmp membership group** command is entered:

```
user@host> show igmp group
```

| Interface | Group           | Last Reported | Timeout |
|-----------|-----------------|---------------|---------|
| so-0/0/0  | 224.2.127.253   | 10.1.128.1    | 210     |
| so-0/0/0  | 239.255.255.255 | 10.1.128.1    | 210     |
| so-0/0/0  | 224.1.127.255   | 10.1.128.1    | 215     |
| so-0/0/0  | 224.2.127.254   | 10.1.128.1    | 216     |
| local     | 224.0.0.6       | (null)        | 0       |
| local     | 224.0.0.5       | (null)        | 0       |
| local     | 224.2.127.254   | (null)        | 0       |
| local     | 239.255.255.255 | (null)        | 0       |
| local     | 224.0.0.2       | (null)        | 0       |
| local     | 224.0.0.13      | (null)        | 0       |

```
user@host> clear igmp membership group 239.225/16
```

```
Clearing Group Membership Range 239.225.0.0/16 on so-0/0/0
Clearing Group Membership Range 239.225.0.0/16 on so-1/0/0
Clearing Group Membership Range 239.225.0.0/16 on so-2/0/0
```

```
user@host> show igmp group
```

| Interface | Group           | Last Reported | Timeout |
|-----------|-----------------|---------------|---------|
| so-0/0/0  | 224.1.127.255   | 10.1.128.1    | 231     |
| so-0/0/0  | 224.2.127.254   | 10.1.128.1    | 233     |
| so-0/0/0  | 224.2.127.253   | 10.1.128.1    | 236     |
| local     | 224.0.0.6       | (null)        | 0       |
| local     | 224.0.0.5       | (null)        | 0       |
| local     | 224.2.127.254   | (null)        | 0       |
| local     | 239.255.255.255 | (null)        | 0       |
| local     | 224.0.0.2       | (null)        | 0       |
| local     | 224.0.0.13      | (null)        | 0       |



## clear igmp snooping membership

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear igmp snooping membership<br><group   source <i>address</i> ><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><learning-domain <i>learning-domain-name</i> ><br><logical-system <i>logical-system-name</i> ><br><vlan-id <i>vlan-identifier</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Clear IP IGMP snooping membership information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>none</b>—Clear IGMP snooping membership for all supported address families on all interfaces.</p> <p><b>group   source <i>address</i></b>—(Optional) Clear IGMP snooping membership for the specified multicast group or source address.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear IGMP snooping membership for the specified instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear IGMP snooping membership on a specific interface.</p> <p><b>learning-domain <i>learning-domain-name</i></b>—(Optional) Perform this operation on all learning domains or on a particular learning domain.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or for all logical systems.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Perform this operation on a particular VLAN.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show igmp snooping membership on page 1513</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>    | <a href="#">clear igmp snooping membership on page 1455</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### clear igmp snooping membership

```
user@host> clear igmp snooping membership
```

## clear igmp snooping statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear igmp snooping statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;learning-domain (all   <i>learning-domain-name</i>)&gt;</code><br><code>&lt;logical-system <i>logical-system-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Clear IP IGMP snooping statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—Clear IGMP snooping statistics for all supported address families on all interfaces.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear IGMP snooping statistics for the specified instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear IGMP snooping statistics on a specific interface.</p> <p><b>learning-domain (all   <i>learning-domain-name</i>)</b>—(Optional) Perform this operation on all learning domains or on a particular learning domain.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Delete the IGMP snooping statistics for a given logical system or for all logical systems.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show igmp snooping statistics on page 1517</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">clear igmp snooping statistics on page 1456</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### clear igmp snooping statistics

```
user@host> clear igmp snooping statistics
```

## clear igmp statistics

|                                    |                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1457</a><br><a href="#">Syntax (EX Series Switches) on page 1457</a>                                                                                                                                                                                                                                      |
| <b>Syntax</b>                      | clear igmp statistics<br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                  |
| <b>Syntax (EX Series Switches)</b> | clear igmp statistics<br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                             |
| <b>Description</b>                 | Clear Internet Group Management Protocol (IGMP) statistics.                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <b>none</b> —Clear IGMP statistics on all interfaces.<br><br><b>interface <i>interface-name</i></b> —(Optional) Clear IGMP statistics for the specified interface only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | clear                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>       | <a href="#">clear igmp statistics on page 1457</a>                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>               | See <a href="#">show igmp statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                        |

## Sample Output

### clear igmp statistics

The following sample output displays IGMP statistics information before and after the **clear igmp statistics** command is entered:

```

user@host> show igmp statistics
IGMP packet statistics for all interfaces
IGMP Message type Received Sent Rx errors
Membership Query 8883 459 0
V1 Membership Report 0 0 0
DVMRP 19784 35476 0
PIM V1 18310 0 0
Cisco Trace 0 0 0
V2 Membership Report 0 0 0
Group Leave 0 0 0
Mtrace Response 0 0 0
Mtrace Request 0 0 0
Domain Wide Report 0 0 0
V3 Membership Report 0 0 0
Other Unknown types 0 0 0

```

|                                     |   |
|-------------------------------------|---|
| IGMP v3 unsupported type            | 0 |
| IGMP v3 source required for SSM     | 0 |
| IGMP v3 mode not applicable for SSM | 0 |

|                        |      |
|------------------------|------|
| IGMP Global Statistics |      |
| Bad Length             | 0    |
| Bad Checksum           | 0    |
| Bad Receive If         | 0    |
| Rx non-local           | 1227 |

user@host> clear igmp statistics

user@host> show igmp statistics

IGMP packet statistics for all interfaces

| IGMP Message type                   | Received | Sent | Rx errors |
|-------------------------------------|----------|------|-----------|
| Membership Query                    | 0        | 0    | 0         |
| V1 Membership Report                | 0        | 0    | 0         |
| DVMRP                               | 0        | 0    | 0         |
| PIM V1                              | 0        | 0    | 0         |
| Cisco Trace                         | 0        | 0    | 0         |
| V2 Membership Report                | 0        | 0    | 0         |
| Group Leave                         | 0        | 0    | 0         |
| Mtrace Response                     | 0        | 0    | 0         |
| Mtrace Request                      | 0        | 0    | 0         |
| Domain Wide Report                  | 0        | 0    | 0         |
| V3 Membership Report                | 0        | 0    | 0         |
| Other Unknown types                 |          |      | 0         |
| IGMP v3 unsupported type            |          |      | 0         |
| IGMP v3 source required for SSM     |          |      | 0         |
| IGMP v3 mode not applicable for SSM |          |      | 0         |
| IGMP Global Statistics              |          |      |           |
| Bad Length                          | 0        |      |           |
| Bad Checksum                        | 0        |      |           |
| Bad Receive If                      | 0        |      |           |
| Rx non-local                        | 0        |      |           |

## clear mld membership

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear mld membership<br><all><br><group <i>group-name</i> ><br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Clear Multicast Listener Discovery (MLD) group membership.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>all</b>—(Optional) Clear MLD memberships for groups and interfaces in the master instance.</p> <p><b>none</b>—Automatically clears MLD memberships for groups and interfaces in the master instance.</p> <p><b>group <i>group-name</i></b>—(Optional) Clear MLD membership for the specified group.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear MLD group membership for the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mld group on page 1525</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>    | <a href="#">clear mld membership all on page 1459</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### clear mld membership all

```
user@host> clear mld membership all
```

## clear mld statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear mld statistics</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Clear Multicast Listener Discovery (MLD) statistics.                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <b>none</b> —(Same as <b>logical-system all</b> ) Clear MLD statistics for all interfaces.<br><br><b>interface <i>interface-name</i></b> —(Optional) Clear MLD statistics for the specified interface.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show mld statistics on page 1533</a></li></ul>                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">clear mld statistics on page 1460</a>                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                               |

## Sample Output

### clear mld statistics

```
user@host> clear mld statistics
```

## clear msdp cache

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear msdp cache<br><all><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><peer <i>peer-address</i> >                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Clear the entries in the Multicast Source Discovery Protocol (MSDP) source-active cache.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>all</b>— Clear all MSDP source-active cache entries in the master instance..</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear entries for a specific MSDP instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>peer <i>peer-address</i></b>—(Optional) Clear the MSDP source-active cache entries learned from a specific peer.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show msdp source-active on page 1540</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">clear msdp cache all on page 1461</a>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### clear msdp cache all

```
user@host> clear msdp cache all
```

## clear msdp statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear msdp statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;peer <i>peer-address</i>&gt;</code>                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Clear Multicast Source Discovery Protocol (MSDP) peer statistics.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <b>none</b> —Clear MSDP statistics for all peers.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear statistics for the specified instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>peer <i>peer-address</i></b> —(Optional) Clear the statistics for the specified peer. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp statistics on page 1543</a></li></ul>                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">clear msdp statistics on page 1462</a>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                               |

## Sample Output

### clear msdp statistics

```
user@host> clear msdp statistics
```



## clear multicast bandwidth-admission

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>clear multicast bandwidth-admission &lt;group <i>group-address</i>&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;source <i>source-address</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 8.3.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Reapply IP multicast bandwidth admissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Reapply multicast bandwidth admissions for all IPv4 forwarding entries in the master routing instance.</p> <p><b>group <i>group-address</i></b>—(Optional) Reapply multicast bandwidth admissions for the specified group.</p> <p><b>inet</b>—(Optional) Reapply multicast bandwidth admission settings for IPv4 flows.</p> <p><b>inet6</b>—(Optional) Reapply multicast bandwidth admission settings for IPv6 flows.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Reapply multicast bandwidth admission settings for the specified instance. If you do not specify an instance, the command applies to the master routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Examines the corresponding outbound interface in the relevant entries and acts as follows:</p> <ul style="list-style-type: none"> <li>• If the interface is congested, and it was admitted previously, it is removed.</li> <li>• If the interface was rejected previously, the <b>clear multicast bandwidth-admission</b> command enables the interface to be admitted as long as enough bandwidth exists on the interface.</li> <li>• If you do not specify an interface, issuing the <b>clear multicast bandwidth-admission</b> command readmits any previously rejected interface for the relevant entries as long as enough bandwidth exists on the interface.</li> </ul> <p>To manually reject previously admitted outbound interfaces, you must specify the interface.</p> <p><b>source <i>source-address</i></b>—(Optional) Use with the <b>group</b> option to reapply multicast bandwidth admission settings for the specified (source, group) entry.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Related Documentation** • [show multicast interface on page 1553](#)

**List of Sample Output** [clear multicast bandwidth-admission on page 1464](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

[clear multicast bandwidth-admission](#)

```
user@host> clear multicast bandwidth-admission
```

## clear multicast forwarding-cache

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear multicast forwarding-cache<br><all><br><inet   inet6><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Clear IP multicast forwarding cache entries.<br><br>This command is not supported for next-generation multiprotocol BGP multicast VPNs (MVPNs).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>all</b>—(Optional) Clear all multicast forwarding cache entries in the master instance.</p> <p><b>none</b>—(Default) Automatically clears all multicast forwarding cache entries.</p> <p><b>inet</b>—(Optional) Clear multicast forwarding cache entries for IPv4 family addresses.</p> <p><b>inet6</b>—(Optional) Clear multicast forwarding cache entries for IPv6 family addresses.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear multicast forwarding cache entries on a specific routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show multicast forwarding-cache statistics on page 1551</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">clear multicast forwarding-cache all on page 1465</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Sample Output

### clear multicast forwarding-cache all

```
user@host> clear multicast forwarding-cache all
```

## clear multicast scope

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1466</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1466</a>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                                       | <pre>clear multicast scope &lt;inet   inet6&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear multicast scope &lt;inet   inet6&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 7.6.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> option introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                  | Clear IP multicast scope statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                      | <p><b>none</b>—(Same as <b>logical-system all</b>) Clear multicast scope statistics.</p> <p><b>inet</b>—(Optional) Clear multicast scope statistics for IPv4 family addresses.</p> <p><b>inet6</b>—(Optional) Clear multicast scope statistics for IPv6 family addresses.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear multicast scope statistics on a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show multicast scope on page 1574</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast scope on page 1466</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Sample Output

### clear multicast scope

```
user@host> clear multicast scope
```

## clear multicast sessions

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1467</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1467</a>                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                                       | clear multicast sessions<br><logical-system (all   <i>logical-system-name</i> )><br>< <i>regular-expression</i> >                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | clear multicast sessions<br>< <i>regular-expression</i> >                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                     |
| <b>Description</b>                                  | Clear IP multicast sessions.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                      | <p><b>none</b>—(Same as <b>logical-system all</b>) Clear multicast sessions.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>regular-expression</i></b>—(Optional) Clear only multicast sessions that contain the specified regular expression.</p> |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">show multicast sessions on page 1578</a></li> </ul>                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast sessions on page 1467</a>                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                        |

## Sample Output

### clear multicast sessions

```
user@host> clear multicast sessions
```

## clear multicast snooping statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear multicast snooping statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Clear IP multicast snooping statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><b>none</b>—Clear multicast snooping statistics for all supported address families on all interfaces.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear multicast snooping statistics for the specified instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear multicast snooping statistics on a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">clear multicast snooping statistics on page 1468</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### Sample Output

#### clear multicast snooping statistics

```
user@host> clear multicast snooping statistics
```

## clear multicast statistics

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1469</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1469</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                                       | clear multicast statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | clear multicast statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                                  | Clear IP multicast statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                      | <b>none</b> —Clear multicast statistics for all supported address families on all interfaces.<br><b>inet</b> —(Optional) Clear multicast statistics for IPv4 family addresses.<br><b>inet6</b> —(Optional) Clear multicast statistics for IPv6 family addresses.<br><b>instance <i>instance-name</i></b> —(Optional) Clear multicast statistics for the specified instance.<br><b>interface <i>interface-name</i></b> —(Optional) Clear multicast statistics on a specific interface.<br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">show multicast statistics on page 1585</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast statistics on page 1469</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Sample Output

### clear multicast statistics

```
user@host> clear multicast statistics
```

## clear pim join

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1470</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1470</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                       | <pre>clear pim join &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim join &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>                                  | Clear the Protocol Independent Multicast (PIM) join and prune states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                                      | <p><b>none</b>—Clear the PIM join and prune states for all groups, family addresses, and instances.</p> <p><b>group-address</b>—(Optional) Clear the PIM join and prune states for a group address.</p> <p><b>inet   inet6</b>—(Optional) Clear the PIM join and prune states for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance instance-name</b>—(Optional) Clear the join and prune states for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim join</b> command cannot be used to clear the PIM join and prune state on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show pim join on page 1596</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>                        | <a href="#">clear pim join on page 1471</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## Sample Output

clear pim join

```
user@host> clear pim join
```

## clear pim join-distribution

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>clear pim join-distribution &lt;all&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>Clear the PIM <b>join-redistribute</b> states.</p> <p>Use the <b>show pim source</b> command to find out if there are multiple paths available for a source (for example, an RP).</p> <p>When you include the <b>join-load-balance</b> statement in the configuration, the PIM join states are distributed evenly on available equal-cost multipath links. When an upstream neighbor link fails, Junos OS redistributes the PIM join states to the remaining links. However, when new links are added or the failed link is restored, the existing PIM joins are not redistributed to the new link. New flows will be distributed to the new links. However, in a network without new joins and prunes, the new link is not used for multicast traffic. The <b>clear pim join-distribution</b> command redistributes the existing flows to the new upstream neighbors. Redistributing the existing flows causes traffic to be disrupted, so we recommend that you run the <b>clear pim join-distribution</b> command during a maintenance window.</p> |
| <b>Options</b>                  | <p><b>all</b>— (Optional) Clear the PIM <b>join-redistribute</b> states for all groups and family addresses in the master instance.</p> <p><b>none</b>— Automatically clear all PIM join/prune states.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Redistribute the join states for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Additional Information</b>   | The <b>clear pim join-distribution</b> command cannot be used to redistribute the PIM join states on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show pim neighbors on page 1625</a></li><li>• <a href="#">show pim join on page 1596</a></li><li>• <a href="#">join-load-balance</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">clear pim join-distribution all on page 1473</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**Output Fields** When you enter this command, you are provided no feedback on the status of your request. You can enter the **show pim join** command before and after distributing the join state to verify the operation.

### Sample Output

`clear pim join-distribution all`

```
user@host> clear pim join-distribution all
```

## clear pim register

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1474</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1474</a><br><a href="#">Syntax (PTX Series) on page 1474</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>                                       | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (PTX Series)</b>                          | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 7.6.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                  | Clear Protocol Independent Multicast (PIM) register message counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                      | <p><b>none</b>—Clear PIM register message counters for all family addresses, instances, and interfaces.</p> <p><b>inet   inet6</b>—(Optional) Clear PIM register message counters for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear register message counters for a specific PIM-enabled routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear PIM register message counters for a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim register</b> command cannot be used to clear the PIM register state on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Related Documentation** • [show pim statistics on page 1656](#)

**List of Sample Output** [clear pim register on page 1475](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

[clear pim register](#)

```
user@host> clear pim register
```

## clear pim snooping join

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear pim snooping join</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system <i>logical-system-name</i>&gt;</code><br><code>&lt;vlan-id <i>vlan-id</i>&gt;</code>                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.<br>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Clear information about Protocol Independent Multicast (PIM) snooping joins.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <b>none</b> —Display detailed information.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear PIM snooping join information for the specified routing instance.<br><br><b>logical-system <i>logical-system-name</i></b> —(Optional) Delete the IGMP snooping statistics for a given logical system or for all logical systems.<br><br><b>vlan-id <i>vlan-identifier</i></b> —(Optional) Clear PIM snooping join information for the specified VLAN. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>PIM Snooping for VPLS</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">clear pim snooping join on page 1476</a>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>            | See <a href="#">show pim snooping join</a> for an explanation of the output fields.                                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### clear pim snooping join

The following sample output displays information about PIM snooping joins before and after the **clear pim snooping join** command is entered:

```
user@host> show pim snooping join extensive
Instance: vpls1
Learning-Domain: vlan-id 10
Learning-Domain: vlan-id 20

Group: 225.1.1.2
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.120.5, port: ge-1/3/7.20
Downstream port: ge-1/3/1.20
Downstream neighbors:
20.0.120.2 State: Join Flags: SRW Timeout: 185

Group: 225.1.1.3
```

```
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.120.4, port: ge-1/3/5.20
Downstream port: ge-1/3/3.20
Downstream neighbors:
20.0.120.3 State: Join Flags: SRW Timeout: 175

user@host> clear pim snooping join
Clearing the Join/Prune state for 224.0.0.0/4
Clearing the Join/Prune state for 224.0.0.0/4

user@host> show pim snooping join extensive
Instance: vpls1
Learning-Domain: vlan-id 10
Learning-Domain: vlan-id 20
```

## clear pim snooping statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear pim snooping statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;logical-system <i>logical-system-name</i>&gt;</code><br><code>&lt;vlan-id <i>vlan-id</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.<br>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Clear Protocol Independent Multicast (PIM) snooping statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <b>none</b> —Clear PIM snooping statistics for all family addresses, instances, and interfaces.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear statistics for a specific PIM-snooping-enabled routing instance.<br><br><b>interface <i>interface-name</i></b> —(Optional) Clear PIM snooping statistics for a specific interface.<br><br><b>logical-system <i>logical-system-name</i></b> —(Optional) Delete the IGMP snooping statistics for a given logical system or for all logical systems.<br><br><b>vlan-id <i>vlan-identifier</i></b> —(Optional) Clear PIM snooping statistics information for the specified VLAN. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>PIM Snooping for VPLS</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">clear pim snooping statistics on page 1478</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | See <a href="#">show pim snooping statistics</a> for an explanation of the output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### clear pim snooping statistics

The following sample output displays PIM snooping statistics before and after the **clear pim snooping statistics** command is entered:

```
user@host> show pim snooping statistics
Instance: vpls1
Learning-Domain: vlan-id 10

Tx J/P messages 0
RX J/P messages 660
Rx J/P messages -- seen 0
Rx J/P messages -- received 660
Rx Hello messages 1396
Rx Version Unknown 0
Rx Neighbor Unknown 0
```



```
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
```

```
Learning-Domain: vlan-id 20
```

```
user@host> clear pim snooping statistics
```

```
user@host> show pim snooping statistics
```

```
Instance: vpls1
```

```
Learning-Domain: vlan-id 10
```

```
Tx J/P messages 0
RX J/P messages 0
Rx J/P messages -- seen 0
Rx J/P messages -- received 0
Rx Hello messages 0
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
```

```
Learning-Domain: vlan-id 20
```

## clear pim statistics

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1480</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1480</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax</b>                                       | <pre>clear pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                  | Clear Protocol Independent Multicast (PIM) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                                      | <p><b>none</b>—Clear PIM statistics for all family addresses, instances, and interfaces.</p> <p><b>inet   inet6</b>—(Optional) Clear PIM statistics for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear statistics for a specific PIM-enabled routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear PIM statistics for a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim statistics</b> command cannot be used to clear the PIM statistics on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show pim statistics on page 1656</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>                        | <a href="#">clear pim statistics on page 1481</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>                                | See <a href="#">show pim statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### clear pim statistics

The following sample output displays PIM statistics before and after the **clear pim statistics** command is entered:

```
user@host> show pim statistics
PIM statistics on all interfaces:
PIM Message type Received Sent Rx errors
Hello 0 0 0
Register 0 0 0
Register Stop 0 0 0
Join Prune 0 0 0
Bootstrap 0 0 0
Assert 0 0 0
Graft 0 0 0
Graft Ack 0 0 0
Candidate RP 0 0 0
V1 Query 2111 4222 0
V1 Register 0 0 0
V1 Register Stop 0 0 0
V1 Join Prune 14200 13115 0
V1 RP Reachability 0 0 0
V1 Assert 0 0 0
V1 Graft 0 0 0
V1 Graft Ack 0 0 0
PIM statistics summary for all interfaces:
Unknown type 0
V1 Unknown type 0
Unknown Version 0
Neighbor unknown 0
Bad Length 0
Bad Checksum 0
Bad Receive If 0
Rx Intf disabled 2007
Rx V1 Require V2 0
Rx Register not RP 0
RP Filtered Source 0
Unknown Reg Stop 0
Rx Join/Prune no state 1040
Rx Graft/Graft Ack no state 0
...
```

```
user@host> clear pim statistics
user@host> show pim statistics
PIM statistics on all interfaces:
PIM Message type Received Sent Rx errors
Hello 0 0 0
Register 0 0 0
Register Stop 0 0 0
Join Prune 0 0 0
Bootstrap 0 0 0
Assert 0 0 0
Graft 0 0 0
Graft Ack 0 0 0
Candidate RP 0 0 0
V1 Query 1 0 0
V1 Register 0 0 0
...
```



## request pim multicast-tunnel rebalance

|                                    |                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1483</a><br><a href="#">Syntax (EX Series Switches) on page 1483</a>                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                      | <pre>request pim multicast-tunnel rebalance &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                          |
| <b>Syntax (EX Series Switches)</b> | <pre>request pim multicast-tunnel rebalance &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>         | <p>Command introduced in Junos OS Release 10.2.</p> <p>Command introduced in Junos OS Release 10.2 for EX Series switches.</p>                                                                                                                                                                                                                                             |
| <b>Description</b>                 | <p>Rebalance the assignment of multicast tunnel encapsulation interfaces across available tunnel-capable PICs or across a configured list of tunnel-capable PICs. You can determine whether a rebalance is necessary by running the <b>show pim interfaces instance <i>instance-name</i></b> command.</p>                                                                  |
| <b>Options</b>                     | <p><b>none</b>—Re-create and rebalance all tunnel interfaces for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—Re-create and rebalance all tunnel interfaces for a specific instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | <p>maintenance</p>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li>• <a href="#">show pim interfaces on page 1593</a></li> <li>• <i>Load Balancing Multicast Tunnel Interfaces Among Available PICs</i></li> </ul>                                                                                                                                                                                     |
| <b>Output Fields</b>               | <p>This command produces no output. To verify the operation of the command, run the <b>show pim interface instance <i>instance-name</i></b> before and after running the <b>request pim multicast-tunnel rebalance</b> command.</p>                                                                                                                                        |

## show amt statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show amt statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in JUNOS Release 10.2.                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display information about the Automatic Multicast Tunneling (AMT) protocol tunnel statistics.                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>none</b>—Display summary information about all AMT Protocol tunnels.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear amt statistics on page 1450</a></li> <li>• <a href="#">show amt summary on page 1487</a></li> <li>• <a href="#">show amt tunnel on page 1489</a></li> </ul>                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show amt statistics on page 1485</a>                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | <p><a href="#">Table 86 on page 1484</a> describes the output fields for the <b>show amt statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                           |

**Table 86: show amt statistics Output Fields**

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AMT receive message count | <p>Summary of AMT statistics for messages received on all interfaces.</p> <ul style="list-style-type: none"> <li>• <b>AMT relay discovery</b>—Number of AMT relay discovery messages received.</li> <li>• <b>AMT membership request</b>—Number of AMT membership request messages received.</li> <li>• <b>AMT membership update</b>—Number of AMT membership update messages received.</li> </ul> |
| AMT send message count    | <p>Summary of AMT statistics for messages sent on all interfaces.</p> <ul style="list-style-type: none"> <li>• <b>AMT relay advertisement</b>—Number of AMT relay advertisement messages sent.</li> <li>• <b>AMT membership query</b>—Number of AMT membership query messages sent.</li> </ul>                                                                                                    |

Table 86: show amt statistics Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AMT error message count | <p>Summary of AMT statistics for error messages received on all interfaces.</p> <ul style="list-style-type: none"> <li>• <b>AMT incomplete packet</b>—Number of messages received with length errors so severe that further classification could not occur.</li> <li>• <b>AMT invalid mac</b>—Number of messages received with an invalid message authentication code (MAC).</li> <li>• <b>AMT unexpected type</b>—Number of messages received with an unknown message type specified.</li> <li>• <b>AMT invalid relay discovery address</b>—Number of AMT relay discovery messages received with an address other than the configured anycast address.</li> <li>• <b>AMT invalid membership request address</b>—Number of AMT membership request messages received with an address other than the configured AMT local address.</li> <li>• <b>AMT invalid membership update address</b>—Number of AMT membership update messages received with an address other than the configured AMT local address.</li> <li>• <b>AMT incomplete relay discovery messages</b>—Number of AMT relay discovery messages received that are not fully formed.</li> <li>• <b>AMT incomplete membership request messages</b>—Number of AMT membership request messages received that are not fully formed.</li> <li>• <b>AMT incomplete membership update messages</b>—Number of AMT membership update messages received that are not fully formed.</li> <li>• <b>AMT no active gateway</b>—Number of AMT membership update messages received for a tunnel that does not exist for the gateway that sent the message.</li> <li>• <b>AMT invalid inner header checksum</b>—Number of AMT membership update messages received with an invalid IP checksum.</li> <li>• <b>AMT gateways timed out</b>—Number of gateways that timed out because of inactivity.</li> </ul> |

## Sample Output

### show amt statistics

```
user@host> show amt statistics
```

```

AMT receive message count
AMT relay advertisement : 2
AMT membership request : 5
AMT membership update : 5

AMT send message count
AMT relay advertisement : 2
AMT membership query : 5

AMT error message count
AMT incomplete packet : 0
AMT invalid mac : 0
AMT unexpected type : 0
AMT invalid relay discovery address : 0
AMT invalid membership request address : 0
AMT invalid membership update address : 0
AMT incomplete relay discovery messages : 0
AMT incomplete membership request messages : 0
AMT incomplete membership update messages : 0
AMT no active gateway : 0

```

|                                   |   |   |
|-----------------------------------|---|---|
| AMT invalid inner header checksum | : | 0 |
| AMT gateways timed out            | : | 0 |



## show amt summary

|                                 |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show amt summary<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Display summary information about the Automatic Multicast Tunneling (AMT) protocol.                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Display summary information about all AMT protocol instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear amt tunnel on page 1451</a></li> <li>• <a href="#">show amt statistics on page 1484</a></li> <li>• <a href="#">show amt tunnel on page 1489</a></li> </ul>                                                                                                                                    |
| <b>List of Sample Output</b>    | <a href="#">show amt summary on page 1488</a>                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | <p><a href="#">Table 87 on page 1487</a> describes the output fields for the <b>show amt summary</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                |

**Table 87: show amt summary Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                         | Level of Output |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>AMT anycast prefix</b>  | Prefix advertised by unicast routing protocols to route AMT discovery messages to the router from nearby AMT gateways.                                                                                    | All levels      |
| <b>AMT anycast address</b> | Anycast address configured from which the anycast prefix is derived.                                                                                                                                      | All levels      |
| <b>AMT local address</b>   | Local unique AMT relay IP address configured. Used to send AMT relay advertisement messages, it is the IP source address of AMT control messages and the source address of the data tunnel encapsulation. | All levels      |
| <b>AMT tunnel limit</b>    | Maximum number of AMT tunnels that can be created.                                                                                                                                                        | All levels      |
| <b>active tunnels</b>      | Number of active AMT tunnel interfaces.                                                                                                                                                                   | All levels      |

## Sample Output

show amt summary

```
user@host> show amt summary
 AMT anycast prefix : 20.0.0.4/32
 AMT anycast address : 20.0.0.4
 AMT local address : 20.0.0.4
 AMT tunnel limit : 1000, active tunnels : 2
```

## show amt tunnel

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Syntax</b>                   | <pre>show amt tunnel &lt;brief   detail&gt; &lt;gateway-address <i>gateway-ip-address</i>&gt; &lt;port <i>port-number</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;tunnel-interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| <b>Description</b>              | Display information about the Automatic Multicast Tunneling (AMT) dynamic tunnels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>Options</b>                  | <p><b>none</b>—Display summary information about all AMT protocol instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of detail.</p> <p><b>gateway-address <i>gateway-ip-address</i> port <i>port-number</i></b>—(Optional) Display information for the specified AMT gateway only. If no port is specified, display information for all AMT gateways with the given IP address.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>tunnel-interface <i>interface-name</i></b>—(Optional) Display information for the specified AMT tunnel interface only.</p> |  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear amt tunnel on page 1451</a></li> <li>• <a href="#">show amt statistics on page 1484</a></li> <li>• <a href="#">show amt summary on page 1487</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>List of Sample Output</b>    | <a href="#">show amt tunnel on page 1490</a><br><a href="#">show amt tunnel detail on page 1490</a><br><a href="#">show amt tunnel tunnel-interface on page 1491</a><br><a href="#">show amt tunnel gateway-address on page 1491</a><br><a href="#">show amt tunnel gateway-address detail on page 1491</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Output Fields</b>            | <p><a href="#">Table 88 on page 1489</a> describes the output fields for the <b>show amt tunnel</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |

**Table 88: show amt tunnel Output Fields**

| Field Name          | Field Description                                                     | Level of Output |
|---------------------|-----------------------------------------------------------------------|-----------------|
| AMT gateway address | Address of the AMT gateway that is being connected by the AMT tunnel. | All levels      |

Table 88: show amt tunnel Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>port</b>                          | Client port used by the AMT tunnel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels      |
| <b>AMT tunnel interface</b>          | Dynamically created AMT logical interfaces used by the AMT tunnel in the format <b>ud-FPC/PIC/Port.unit</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels      |
| <b>AMT tunnel state</b>              | State of the AMT tunnel. The state is normally <b>Active</b> . <ul style="list-style-type: none"> <li>• <b>Active</b>—The tunnel is active.</li> <li>• <b>Pending</b>—The tunnel creation is pending. This is a transient state.</li> <li>• <b>Down</b>—The tunnel is in the down state.</li> <li>• <b>Graceful restart pending</b>—Graceful restart is in progress.</li> <li>• <b>Reviving</b>—The routing protocol daemon or Routing Engine was restarted (not gracefully). The tunnel remains in the reviving state until the AMT gateway sends a control message. When the message is received the tunnel is moved to the <b>Active</b> state. If no message is received before the AMT tunnel inactivity timer expires, the tunnel is deleted.</li> </ul> | All levels      |
| <b>AMT tunnel inactivity timeout</b> | Number of seconds since the most recent control message was received from an AMT gateway. If no message is received before the AMT tunnel inactivity timer expires, the tunnel is deleted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels      |
| <b>Number of groups</b>              | Number of multicast groups using the tunnel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Group</b>                         | Multicast group address or addresses using the tunnel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail</b>   |
| <b>Include Source</b>                | Multicast source address for each IGMPv3 group using the tunnel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail</b>   |
| <b>AMT message count</b>             | Statistics for AMT messages: <ul style="list-style-type: none"> <li>• <b>AMT Request</b>—Number of AMT relay tunnel request messages received.</li> <li>• <b>AMT membership update</b>—Number of AMT membership update messages received.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels      |

## Sample Output

### show amt tunnel

```

user@host> show amt tunnel
AMT gateway address : 11.11.11.2, port : 2268
AMT tunnel interface : ud-5/1/10.1120256
AMT tunnel state : Active
AMT tunnel inactivity timeout : 15
Number of groups : 1

AMT message count:
AMT Request AMT membership update
2 2

```

### show amt tunnel detail

```

user@host> show amt tunnel detail
AMT gateway address : 11.11.11.2, port : 2268
AMT tunnel interface : ud-5/3/10.1120512

```

```

AMT tunnel state : Active
AMT tunnel inactivity timeout : 62
Number of groups : 1
Group: 226.2.3.2

AMT message count:
AMT Request AMT membership update
2 2

AMT gateway address : 11.11.11.3, port : 2268
AMT tunnel interface : ud-5/2/10.1120513
AMT tunnel state : Active
AMT tunnel inactivity timeout : 214
Number of groups : 1
Group: 226.2.3.3

AMT message count:
AMT Request AMT membership update
2 2

```

#### show amt tunnel tunnel-interface

```

user@host> show amt tunnel tunnel-interface ud-5/3/10.1120512
AMT gateway address : 11.11.11.2, port : 2268
AMT tunnel interface : ud-5/3/10.1120512
AMT tunnel state : Active
AMT tunnel inactivity timeout : 145
Number of groups : 1

AMT message count:
AMT Request AMT membership update
2 2

```

#### show amt tunnel gateway-address

```

user@host> show amt tunnel gateway-address 11.11.11.3 port 2268
AMT gateway address : 11.11.11.3, port : 2268
AMT tunnel interface : ud-5/2/10.1120513
AMT tunnel state : Active
AMT tunnel inactivity timeout : 214
Number of groups : 1
Group: 226.2.3.3

AMT message count:
AMT Request AMT membership update
2 2

```

#### show amt tunnel gateway-address detail

```

user@host> show amt tunnel gateway-address 11.11.11.2 detail
AMT gateway address : 11.11.11.2, port : 2268
AMT tunnel interface : ud-5/3/10.1120512
AMT tunnel state : Active
AMT tunnel inactivity timeout : 234
Number of groups : 1
Group: 226.2.3.2

AMT message count:
AMT Request AMT membership update
2 2

```

## show dvmrp interfaces

|                                 |                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show dvmrp interfaces<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                        |
| <b>Description</b>              | Display information about Distance Vector Multicast Routing Protocol (DVMRP)–enabled interfaces.                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>logical-system all</b>) Display information about DVMRP-enabled interfaces.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show dvmrp interfaces on page 1493</a>                                                                                                                                                                                                                     |
| <b>Output Fields</b>            | <a href="#">Table 89 on page 1492</a> describes the output fields for the <b>show dvmrp interfaces</b> command. Output fields are listed in the approximate order in which they appear.                                                                                |

**Table 89: show dvmrp interfaces Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                      |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interface</b> | Name of the interface.                                                                                                                                                                                                                                                                                 |
| <b>State</b>     | State of the interface: <b>up</b> or <b>down</b> .                                                                                                                                                                                                                                                     |
| <b>Leaf</b>      | Whether the interface is a leaf (that is, whether it has no neighbors) or whether it has neighbors.                                                                                                                                                                                                    |
| <b>Metric</b>    | Interface metric: a value from 1 through 31.                                                                                                                                                                                                                                                           |
| <b>Announce</b>  | Number of routes the interface is announcing.                                                                                                                                                                                                                                                          |
| <b>Mode</b>      | DVMRP mode: <ul style="list-style-type: none"> <li>• <b>Forwarding</b>—DVMRP does both the routing and the multicast data forwarding.</li> <li>• <b>Unicast-routing</b>—DVMRP does only the routing. Forwarding of the multicast data packets can be done by enabling PIM on the interface.</li> </ul> |

## Sample Output

### show dvmrp interfaces

```
user@host> show dvmrp interfaces
Interface State Leaf Metric Announce Mode
fxp0.0 Up N 1 4 Forwarding
fxp1.0 Up N 1 4 Forwarding
fxp2.0 Up N 1 3 Forwarding
lo0.0 Up Y 1 0 Unicast-routing
```

## show dvmrp neighbors

|                                 |                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show dvmrp neighbors<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                               |
| <b>Description</b>              | Display information about Distance Vector Multicast Routing Protocol (DVMRP) neighbors.                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>logical-system all</b>) Display information about DVMRP neighbors.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show dvmrp neighbors on page 1495</a>                                                                                                                                                                                                             |
| <b>Output Fields</b>            | Table 90 on page 1494 describes the output fields for the <b>show dvmrp neighbors</b> command. Output fields are listed in the approximate order in which they appear.                                                                                        |

Table 90: show dvmrp neighbors Output Fields

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Neighbor</b>    | Address of the neighboring DVMRP router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Interface</b>   | Interface through which the neighbor is reachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Version</b>     | Version of DVMRP that the neighbor is running, in the format <i>majorminor</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Flags</b>       | <p>Information about the neighbor:</p> <ul style="list-style-type: none"> <li><b>1</b>—One way. The local router has seen the neighbor, but the neighbor has not seen the local router.</li> <li><b>G</b>—Neighbor supports generation ID.</li> <li><b>L</b>—Neighbor is a leaf router.</li> <li><b>M</b>—Neighbor supports mtrace.</li> <li><b>N</b>—Neighbor supports netmask in prune messages and graft messages.</li> <li><b>P</b>—Neighbor supports pruning.</li> <li><b>S</b>—Neighbor supports SNMP.</li> </ul> |
| <b>Routes</b>      | Number of routes learned from the neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Timeout</b>     | How long until the DVMRP neighbor information times out, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Transitions</b> | Number of generation ID changes that have occurred since the local router learned about the neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                   |



## Sample Output

show dvmrp neighbors

```
user@host> show dvmrp neighbors
Neighbor Interface Version Flags Routes Timeout Transitions
192.168.1.1 ipip.0 3.255 PGM 3 28 1
```

## show dvmrp prefix

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show dvmrp prefix<br><brief   detail><br><logical-system (all   <i>logical-system-name</i> )><br><prefix>                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display information about Distance Vector Multicast Routing Protocol (DVMRP) prefixes.                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about all DVMRP prefixes.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>prefix</b>—(Optional) Display information about specific prefixes.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show dvmrp prefix on page 1497</a><br><a href="#">show dvmrp prefix brief on page 1497</a><br><a href="#">show dvmrp prefix detail on page 1497</a>                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | Table 91 on page 1496 describes the output fields for the <b>show dvmrp prefix</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                               |

Table 91: show dvmrp prefix Output Fields

| Field Name             | Field Description                                                    | Level of Output |
|------------------------|----------------------------------------------------------------------|-----------------|
| Prefix                 | DVMRP route.                                                         | All levels      |
| Next hop               | Next hop from which the route was learned.                           | All levels      |
| Age                    | Last time that the route was refreshed.                              | All levels      |
| <i>multicast-group</i> | Multicast group address.                                             | <b>detail</b>   |
| Prunes sent            | Number of prune messages sent to the multicast group.                | <b>detail</b>   |
| Grafts sent            | Number of grafts sent to the multicast group.                        | <b>detail</b>   |
| Cache lifetime         | Lifetime of the group in the multicast cache, in seconds.            | <b>detail</b>   |
| Prune lifetime         | Lifetime remaining and total lifetime of prune messages, in seconds. | <b>detail</b>   |

## Sample Output

### show dvmrp prefix

```
user@host> show dvmrp prefix
Prefix Next hop Age
10.38.0.0 /30 10.38.0.1 00:06:17
10.38.0.4 /30 10.38.0.5 00:06:13
10.38.0.8 /30 10.38.0.2 00:00:04
10.38.0.12 /30 10.38.0.6 00:00:04
10.255.14.114 /32 10.255.14.114 00:06:17
10.255.14.142 /32 10.38.0.2 00:00:04
10.255.14.144 /32 10.38.0.2 00:00:04
10.255.70.15 /32 10.38.0.6 00:00:04
192.168.14.0 /24 192.168.14.114 00:06:17
192.168.195.40 /30 192.168.195.41 00:06:17
192.168.195.92 /30 10.38.0.2 00:00:04
```

### show dvmrp prefix brief

The output for the **show dvmrp prefix brief** command is identical to that for the **show dvmrp prefix** command.

### show dvmrp prefix detail

```
user@host> show dvmrp prefix detail
Prefix Next hop Age
10.38.0.0 /30 10.38.0.1 00:06:28
10.38.0.4 /30 10.38.0.5 00:06:24
10.38.0.8 /30 10.38.0.2 00:00:15
10.38.0.12 /30 10.38.0.6 00:00:15
10.255.14.114 /32 10.255.14.114 00:06:28
10.255.14.142 /32 10.38.0.2 00:00:15
10.255.14.144 /32 10.38.0.2 00:00:15
10.255.70.15 /32 10.38.0.6 00:00:15
192.168.14.0 /24 192.168.14.114 00:06:28
192.168.195.40 /30 192.168.195.41 00:06:28
192.168.195.92 /30 10.38.0.2 00:00:15
```

## show dvmrp prunes

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show dvmrp prunes<br><all   rx   tx><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Display information about active Distance Vector Multicast Routing Protocol (DVMRP) prune messages.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>none</b>—Display received and transmitted DVMRP prune information.</p> <p><b>all</b>—(Optional) Display information about all received and transmitted prune messages.</p> <p><b>rx</b>—(Optional) Display information about received prune messages.</p> <p><b>tx</b>—(Optional) Display information about transmitted prune messages.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show dvmrp prunes on page 1498</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | <a href="#">Table 92 on page 1498</a> describes the output fields for the <b>show dvmrp prunes</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                           |

**Table 92: show dvmrp prunes Output Fields**

| Field Name           | Field Description                                                          |
|----------------------|----------------------------------------------------------------------------|
| <b>Group</b>         | Group address.                                                             |
| <b>Source prefix</b> | Prefix for the prune.                                                      |
| <b>Timeout</b>       | How long until the prune message expires, in seconds.                      |
| <b>Neighbor</b>      | Neighbor to which the prune was sent or from which the prune was received. |

## Sample Output

### show dvmrp prunes

```

user@host> show dvmrp prunes
Group Source prefix Timeout Neighbor
224.0.1.1 128.112.0.0 /12 7077 192.168.1.1
224.0.1.32 160.0.0.0 /3 7087 192.168.1.1
224.2.123.4 136.0.0.0 /5 6955 192.168.1.1
224.2.127.1 129.0.0.0 /8 7046 192.168.1.1

```

```
224.2.135.86 128.102.128.0 /17 7071 192.168.1.1
224.2.135.86 129.0.0.0 /8 7074 192.168.1.1
224.2.135.86 130.0.0.0 /7 7071 192.168.1.1
...
```

## show igmp group

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1500</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1500</a>                                                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>                                       | <pre>show igmp group &lt;brief   detail&gt; &lt;group-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show igmp group &lt;brief   detail&gt; &lt;group-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                   |
| <b>Description</b>                                  | Display Internet Group Management Protocol (IGMP) group membership information.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about membership for all IGMP groups.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>group-name</b>—(Optional) Display group membership for the specified IP address only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>                        | <a href="#">show igmp group (Include Mode) on page 1501</a><br><a href="#">show igmp group (Exclude Mode) on page 1502</a><br><a href="#">show igmp group brief on page 1502</a><br><a href="#">show igmp group detail on page 1502</a>                                                                                                                                                                                   |
| <b>Output Fields</b>                                | <p><a href="#">Table 93 on page 1500</a> describes the output fields for the <b>show igmp group</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                  |

**Table 93: show igmp group Output Fields**

| Field Name        | Field Description                                                                                                                                       | Level of Output |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Interface</b>  | Name of the interface that received the IGMP membership report. A name of <b>local</b> indicates that the local routing device joined the group itself. | All levels      |
| <b>Group</b>      | Group address.                                                                                                                                          | All levels      |
| <b>Group Mode</b> | Mode the SSM group is operating in: <b>Include</b> or <b>Exclude</b> .                                                                                  | All levels      |
| <b>Source</b>     | Source address.                                                                                                                                         | All levels      |

Table 93: show igmp group Output Fields (*continued*)

| Field Name       | Field Description                                                                                                                                                                                                         | Level of Output |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Source timeout   | Time remaining until the group traffic is no longer forwarded. The timer is refreshed when a listener in include mode sends a report. A group in exclude mode or configured as a static group displays a zero timer.      | detail          |
| Last reported by | Address of the host that last reported membership in this group.                                                                                                                                                          | All levels      |
| Timeout          | Time remaining until the group membership is removed.                                                                                                                                                                     | brief none      |
| Group timeout    | Time remaining until a group in exclude mode moves to include mode. The timer is refreshed when a listener in exclude mode sends a report. A group in include mode or configured as a static group displays a zero timer. | detail          |
| Type             | Type of group membership: <ul style="list-style-type: none"> <li>• <b>Dynamic</b>—Host reported the membership.</li> <li>• <b>Static</b>—Membership is configured.</li> </ul>                                             | All levels      |

## Sample Output

### show igmp group (Include Mode)

```

user@host> show igmp group
Interface: t1-0/1/0.0
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.2
 Last reported by: 10.9.5.2
 Timeout: 24 Type: Dynamic
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.3
 Last reported by: 10.9.5.2
 Timeout: 24 Type: Dynamic
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.4
 Last reported by: 10.9.5.2
 Timeout: 24 Type: Dynamic
 Group: 232.1.1.2
 Group mode: Include
 Source: 10.0.0.4
 Last reported by: 10.9.5.2
 Timeout: 24 Type: Dynamic
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
 Group: 224.0.0.2
 Source: 0.0.0.0
 Last reported by: Local
 Timeout: 0 Type: Dynamic
 Group: 224.0.0.22
 Source: 0.0.0.0

```

```
Last reported by: Local
Timeout: 0 Type: Dynamic
```

### show igmp group (Exclude Mode)

```
user@host> show igmp group
Interface: t1-0/1/0.0
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
 Group: 224.0.0.2
 Source: 0.0.0.0
 Last reported by: Local
 Timeout: 0 Type: Dynamic
 Group: 224.0.0.22
 Source: 0.0.0.0
 Last reported by: Local
 Timeout: 0 Type: Dynamic
```

### show igmp group brief

The output for the **show igmp group brief** command is identical to that for the **show igmp group** command.

### show igmp group detail

```
user@host> show igmp group detail
Interface: t1-0/1/0.0
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.2
 Source timeout: 12
 Last reported by: 10.9.5.2
 Group timeout: 0 Type: Dynamic
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.3
 Source timeout: 12
 Last reported by: 10.9.5.2
 Group timeout: 0 Type: Dynamic
 Group: 232.1.1.1
 Group mode: Include
 Source: 10.0.0.4
 Source timeout: 12
 Last reported by: 10.9.5.2
 Group timeout: 0 Type: Dynamic
 Group: 232.1.1.2
 Group mode: Include
 Source: 10.0.0.4
 Source timeout: 12
 Last reported by: 10.9.5.2
 Group timeout: 0 Type: Dynamic
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
 Group: 224.0.0.2
 Group mode: Exclude
 Source: 0.0.0.0
 Source timeout: 0
```



```
 Last reported by: Local
 Group timeout: 0 Type: Dynamic
Group: 224.0.0.22
 Group mode: Exclude
 Source: 0.0.0.0
 Source timeout: 0
 Last reported by: Local
 Group timeout: 0 Type: Dynamic
```

## show igmp interface

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1504</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1504</a>                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                       | <pre>show igmp interface &lt;brief   detail&gt; &lt;interface-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show igmp interface &lt;brief   detail&gt; &lt;interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                             |
| <b>Description</b>                                  | Display information about Internet Group Management Protocol (IGMP)-enabled interfaces.                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about all IGMP-enabled interfaces.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>interface-name</b>—(Optional) Display information about the specified IGMP-enabled interface only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">clear igmp membership on page 1452</a></li> </ul>                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                        | <a href="#">show igmp interface on page 1506</a><br><a href="#">show igmp interface brief on page 1506</a><br><a href="#">show igmp interface detail on page 1507</a>                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>                                | <p><a href="#">Table 94 on page 1504</a> describes the output fields for the <b>show igmp interface</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                        |

**Table 94: show igmp interface Output Fields**

| Field Name | Field Description                                                               | Level of Output |
|------------|---------------------------------------------------------------------------------|-----------------|
| Interface  | Name of the interface.                                                          | All levels      |
| Querier    | Address of the routing device that has been elected to send membership queries. | All levels      |

Table 94: show igmp interface Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>State</b>            | State of the interface: <b>Up</b> or <b>Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels      |
| <b>SSM Map Policy</b>   | Name of the source-specific multicast (SSM) map policy that has been applied to the IGMP interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels      |
| <b>Timeout</b>          | How long until the IGMP querier is declared to be unreachable, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels      |
| <b>Version</b>          | IGMP version being used on the interface: <b>1</b> , <b>2</b> , or <b>3</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels      |
| <b>Groups</b>           | Number of groups on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels      |
| <b>Immediate Leave</b>  | State of the immediate leave option: <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates that the router removes a host from the multicast group as soon as the router receives a leave group message from a host associated with the interface.</li> <li>• <b>Off</b>—Indicates that after receiving a leave group message, instead of removing a host from the multicast group immediately, the router sends a group query to determine if another receiver responds.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels      |
| <b>Promiscuous Mode</b> | State of the promiscuous mode option: <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates that the router can accept IGMP reports from subnetworks that are not associated with its interfaces.</li> <li>• <b>Off</b>—Indicates that the router can accept IGMP reports only from subnetworks that are associated with its interfaces.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels      |
| <b>Passive</b>          | State of the passive mode option: <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates that the router can run IGMP on the interface but not send or receive control traffic such as IGMP reports, queries, and leaves.</li> <li>• <b>Off</b>—Indicates that the router can run IGMP on the interface and send or receive control traffic such as IGMP reports, queries, and leaves.</li> </ul> <p>The <b>passive</b> statement enables you to selectively activate up to two out of a possible three available query or control traffic options. When enabled, the following options appear after the <b>on</b> state declaration:</p> <ul style="list-style-type: none"> <li>• <b>send-general-query</b>—The interface sends general queries.</li> <li>• <b>send-group-query</b>—The interface sends group-specific and group-source-specific queries.</li> <li>• <b>allow-receive</b>—The interface receives control traffic.</li> </ul> | All levels      |
| <b>OIF map</b>          | Name of the OIF map (if configured) associated with the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels      |
| <b>SSM map</b>          | Name of the source-specific multicast (SSM) map (if configured) used on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels      |

Table 94: show igmp interface Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Configured Parameters</b> | Information configured by the user: <ul style="list-style-type: none"> <li><b>IGMP Query Interval</b>—Interval (in seconds) at which this router sends membership queries when it is the querier.</li> <li><b>IGMP Query Response Interval</b>—Time (in seconds) that the router waits for a report in response to a general query.</li> <li><b>IGMP Last Member Query Interval</b>—Time (in seconds) that the router waits for a report in response to a group-specific query.</li> <li><b>IGMP Robustness Count</b>—Number of times the router retries a query.</li> </ul> | All levels      |
| <b>Derived Parameters</b>    | Derived information: <ul style="list-style-type: none"> <li><b>IGMP Membership Timeout</b>—Timeout period (in seconds) for group membership. If no report is received for these groups before the timeout expires, the group membership is removed.</li> <li><b>IGMP Other Querier Present Timeout</b>—Time (in seconds) that the router waits for the IGMP querier to send a query.</li> </ul>                                                                                                                                                                              | All levels      |

## Sample Output

### show igmp interface

```

user@host> show igmp interface
Interface: at-0/3/1.0
 Querier: 10.111.30.1
 State: Up Timeout: None Version: 2 Groups: 4
 SSM Map Policy: ssm-policy-A
Interface: so-1/0/0.0
 Querier: 10.111.10.1
 State: Up Timeout: None Version: 2 Groups: 2
 SSM Map Policy: ssm-policy-B
Interface: so-1/0/1.0
 Querier: 10.111.20.1
 State: Up Timeout: None Version: 2 Groups: 4
 SSM Map Policy: ssm-policy-C
Immediate Leave: On
Promiscuous Mode: Off

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Derived Parameters:
IGMP Membership Timeout: 260.0
IGMP Other Querier Present Timeout: 255.0

```

### show igmp interface brief

The output for the **show igmp interface brief** command is identical to that for the **show igmp interface** command. For sample output, see [show igmp interface on page 1506](#).

### show igmp interface detail

The output for the **show igmp interface detail** command is identical to that for the **show igmp interface** command. For sample output, see [show igmp interface on page 1506](#).

## show igmp snooping interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show igmp snooping interface <i>interface-name</i><br><brief   detail><br><bridge-domain <i>bridge-domain-name</i> ><br><logical-system <i>logical-system-name</i> ><br><virtual-switch <i>virtual-switch-name</i> ><br><vlan-id <i>vlan-identifier</i> >                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display IGMP snooping interface information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>none</b> —Display detailed information.</p> <p><b>brief   detail</b>—(Optional) When applicable, this option lets you choose the how much detail to display.</p> <p><b>bridge-domain <i>bridge-domain-name</i></b>—(Optional) Display information about a particular bridge domain.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>virtual-switch <i>virtual-switch-name</i></b>—(Optional) Display information about a particular virtual switch.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display information about a particular VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show igmp snooping membership on page 1513</a></li> <li>• <a href="#">show igmp snooping statistics on page 1517</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show igmp snooping interface on page 1509</a><br><a href="#">show igmp snooping interface on page 1510</a><br><a href="#">show igmp snooping interface (Group Limit Configured) on page 1512</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | Table 95 on page 1508 lists the output fields for the <b>show igmp snooping interface</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 95: show igmp snooping interface Output Fields**

| Field Name       | Field Description                   | Level of Output |
|------------------|-------------------------------------|-----------------|
| Routing-instance | Routing instance for IGMP snooping. | All levels      |
| Learning Domain  | Learning domain for snooping.       | All levels      |

Table 95: show igmp snooping interface Output Fields (*continued*)

| Field Name                         | Field Description                                                                                                                    | Level of Output |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| IGMP Query Interval                | Frequency (in seconds) with which this router sends membership queries when it is the querier.                                       | All levels      |
| IGMP Query Response Interval       | Time (in seconds) that the router waits for a response to a general query.                                                           | All levels      |
| IGMP Last Member Query Interval    | Time (in seconds) that the router waits for a report in response to a group-specific query.                                          | All levels      |
| IGMP Robustness Count              | Number of times the router retries a query.                                                                                          | All levels      |
| immediate-leave                    | State of immediate leave: <b>On</b> or <b>Off</b> .                                                                                  | All levels      |
| router-interface                   | Router interfaces that are part of this learning domain.                                                                             | All levels      |
| Group limit                        | Maximum number of (source,group) pairs allowed per interface. When a group limit is not configured, this field is not shown.         | All levels      |
| interface                          | Interfaces that are being snooped in this learning domain.                                                                           | All levels      |
| Groups                             | Number of groups on the interface.                                                                                                   | All levels      |
| State                              | State of the interface: <b>Up</b> or <b>Down</b> .                                                                                   | All levels      |
| Up Groups                          | Number of active multicast groups attached to the logical interface.                                                                 | All levels      |
| IGMP Membership Timeout            | Timeout for group membership. If no report is received for these groups before the timeout expires, the group membership is removed. | All levels      |
| IGMP Other Querier Present Timeout | Time that the router waits for the IGMP querier to send a query.                                                                     | All levels      |

## Sample Output

### show igmp snooping interface

```

user@host> show igmp snooping interface ge-0/1/4
Instance: default-switch

Bridge-Domain: sample

Learning-Domain: default
Interface: ge-0/1/4.0
State: Up Groups: 0
Immediate leave: Off
Router interface: no

Configured Parameters:
IGMP Query Interval: 125.0

```

```
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Derived Parameters:
IGMP Membership Timeout: 260.0
IGMP Other Querier Present Timeout: 255.0
```

### show igmp snooping interface

```
user@host> show igmp snooping interface logical-system all
logical-system: default
Instance: VPLS-6
Learning-Domain: default
Interface: ge-0/2/2.601
 State: Up Groups: 10
 Immediate leave: Off
 Router interface: no

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Instance: VS-4
Bridge-Domain: VS-4-BD-1
Learning-Domain: vlan-id 1041
Interface: ae2.3
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: no
Interface: ge-0/2/2.1041
 State: Up Groups: 20
 Immediate leave: Off
 Router interface: no

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Instance: default-switch
Bridge-Domain: bd-200
Learning-Domain: default
Interface: ge-0/2/2.100
 State: Up Groups: 20
 Immediate leave: Off
 Router interface: no

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Bridge-Domain: bd0
Learning-Domain: default
Interface: ae0.0
 State: Up Groups: 0
```



```

 Immediate leave: Off
 Router interface: yes
Interface: ae1.0
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: no
Interface: ge-0/2/2.0
 State: Up Groups: 32
 Immediate leave: Off
 Router interface: no

```

```

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

```

```

Instance: VPLS-1
Learning-Domain: default
Interface: ge-0/2/2.502
 State: Up Groups: 11
 Immediate leave: Off
 Router interface: no

```

```

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

```

```

Instance: VS-1
Bridge-Domain: VS-BD-1
Learning-Domain: default
Interface: ae2.0
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: no
Interface: ge-0/2/2.1010
 State: Up Groups: 20
 Immediate leave: Off
 Router interface: no

```

```

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

```

```

Bridge-Domain: VS-BD-2
Learning-Domain: default
Interface: ae2.0
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: no
Interface: ge-0/2/2.1011
 State: Up Groups: 20
 Immediate leave: Off
 Router interface: no

```

```

Configured Parameters:
IGMP Query Interval: 125.0

```

```
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2
```

```
Instance: VPLS-p2mp
Learning-Domain: default
Interface: ge-0/2/2.3001
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: no
```

```
Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2
```

#### show igmp snooping interface (Group Limit Configured)

```
user@host> show igmp snooping interface instance vpls1
Instance: vpls1
```

```
Learning-Domain: default
Interface: ge-1/3/9.0
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: yes
Interface: ge-1/3/8.0
 State: Up Groups: 0
 Immediate leave: Off
 Router interface: yes
 Group limit: 1000
```

```
Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2
```

## show igmp snooping membership

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show igmp snooping membership<br><brief   detail><br><bridge-domain <i>bridge-domain-name</i> ><br><group <i>group-name</i> ><br><logical-system <i>logical-system-name</i> ><br><virtual-switch <i>virtual-switch-name</i> ><br><vlan-id <i>vlan-identifier</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display IGMP snooping membership information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>none</b>—Display detailed information.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>bridge-domain <i>bridge-domain-name</i></b>—(Optional) Display information about a particular bridge domain.</p> <p><b>group <i>group-name</i></b>—(Optional) Display information about this group address.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>virtual-switch <i>virtual-switch-name</i></b>—(Optional) Display information about a particular virtual switch.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display information about a particular VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show igmp snooping interface on page 1508</a></li> <li>• <a href="#">show igmp snooping statistics on page 1517</a></li> <li>• <a href="#">clear igmp snooping membership on page 1455</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>    | <a href="#">show igmp snooping membership on page 1514</a><br><a href="#">show igmp snooping membership (Exclude Mode) on page 1515</a><br><a href="#">show igmp snooping membership interface ge-0/1/2.200 on page 1515</a><br><a href="#">show igmp snooping membership vlan-id 1 on page 1515</a>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | Table 96 on page 1513 lists the output fields for the <b>show igmp snooping membership</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 96: show igmp snooping membership Output Fields**

| Field Name | Field Description                   | Level of Output |
|------------|-------------------------------------|-----------------|
| Instance   | Routing instance for IGMP snooping. | All levels      |

Table 96: show igmp snooping membership Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                    | Level of Output |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Learning Domain</b>  | Learning domain for snooping.                                                                                                                                                                                                                        | All levels      |
| <b>Interface</b>        | Interface on which this router is a proxy.                                                                                                                                                                                                           | <b>detail</b>   |
| <b>Up Groups</b>        | Number of active multicast groups attached to the logical interface.                                                                                                                                                                                 | All levels      |
| <b>Group</b>            | Multicast group address in the membership database.                                                                                                                                                                                                  | All levels      |
| <b>Group Mode</b>       | Mode the SSM group is operating in: <b>Include</b> or <b>Exclude</b> .                                                                                                                                                                               | All levels      |
| <b>Source</b>           | Source address used on queries.                                                                                                                                                                                                                      | <b>detail</b>   |
| <b>Last reported by</b> | Address of source last replying to the query.                                                                                                                                                                                                        | <b>detail</b>   |
| <b>Group Timeout</b>    | Time remaining until a group in exclude mode moves to include mode. The timer is refreshed when a listener in exclude mode sends a report. A group in include mode or configured as a static group displays a zero timer.                            | All levels      |
| <b>Timeout</b>          | Length of time (in seconds) left until the entry is purged.                                                                                                                                                                                          | <b>detail</b>   |
| <b>Type</b>             | Way that the group membership information was learned: <ul style="list-style-type: none"> <li>• <b>Dynamic</b>—Group membership was learned by the IGMP protocol.</li> <li>• <b>Static</b>—Group membership was learned by configuration.</li> </ul> | <b>detail</b>   |
| <b>Include receiver</b> | Source address of receiver included in membership with timeout (in seconds).                                                                                                                                                                         | <b>detail</b>   |

## Sample Output

### show igmp snooping membership

```

user@host> show igmp snooping membership
Instance: vpls2

 Learning-Domain: vlan-id 2
 Interface: ge-3/0/0.2
 Up Groups: 0
 Interface: ge-3/1/0.2
 Up Groups: 0
 Interface: ge-3/1/5.2
 Up Groups: 0

Instance: vpls1

 Learning-Domain: vlan-id 1
 Interface: ge-3/0/0.1
 Up Groups: 0
 Interface: ge-3/1/0.1
 Up Groups: 0
 Interface: ge-3/1/5.1
 Up Groups: 1

```

```

Group: 225.10.10.1
 Group mode: Exclude
 Source: 0.0.0.0
 Last reported by: 100.6.85.2
 Group timeout: 173 Type: Dynamic

```

### show igmp snooping membership (Exclude Mode)

```

user@host> show igmp snooping membership
Instance: vpls2

Learning-Domain: vlan-id 2
Interface: ge-3/0/0.2
Up Groups: 0
Interface: ge-3/1/0.2
Up Groups: 0
Interface: ge-3/1/5.2
Up Groups: 0

Instance: vpls1

Learning-Domain: vlan-id 1
Interface: ge-3/0/0.1
Up Groups: 0
Interface: ge-3/1/0.1
Up Groups: 0
Interface: ge-3/1/5.1
Up Groups: 1
 Group: 225.10.10.1
 Group mode: Exclude
 Source: 0.0.0.0
 Last reported by: 100.6.85.2
 Group timeout: 173 Type: Dynamic

```

### show igmp snooping membership interface ge-0/1/2.200

```

user@host> show igmp snooping membership interface ge-0/1/2.200
Instance: bridge-domain bar

Learning-Domain: default
Interface: ge-0/1/2.200
 Group: 225.1.1.1
 Source: 0.0.0.0
 Timeout: 391 Type: Static
 Group: 232.1.1.1
 Source: 192.168.1.1
 Timeout: 0 Type: Static

```

### show igmp snooping membership vlan-id 1

```

user@host> show igmp snooping membership vlan-id 1
Instance: vpls2

Instance: vpls1

Learning-Domain: vlan-id 1
Interface: ge-3/0/0.1
Up Groups: 0
Interface: ge-3/1/0.1
Up Groups: 0
Interface: ge-3/1/5.1
Up Groups: 1

```

Group: 225.10.10.1  
Group mode: Exclude  
Source: 0.0.0.0  
Last reported by: 100.6.85.2  
Group timeout: 209 Type: Dynamic

## show igmp snooping statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show igmp snooping statistics<br><brief   detail><br><bridge-domain <i>bridge-domain-name</i> ><br><logical-system <i>logical-system-name</i> ><br><virtual-switch <i>virtual-switch-name</i> ><br><vlan-id <i>vlan-identifier</i> >                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Display IGMP snooping statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>none</b>—(Optional) Display detailed information.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>bridge-domain <i>bridge-domain-name</i></b>—(Optional) Display information about a particular bridge domain.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>virtual-switch <i>virtual-switch-name</i></b>—(Optional) Display information about a particular virtual switch.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display information about a particular VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show igmp snooping interface on page 1508</a></li> <li>• <a href="#">show igmp snooping membership on page 1513</a></li> <li>• <a href="#">clear igmp snooping statistics on page 1456</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">show igmp snooping statistics on page 1518</a><br><a href="#">show igmp snooping statistics logical-systems all on page 1519</a><br><a href="#">show igmp snooping statistics interface (Bridge Domains Configured) on page 1520</a>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | <p><a href="#">Table 97 on page 1517</a> lists the output fields for the <b>show igmp snooping statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Table 97: show igmp snooping statistics Output Fields**

| Field Name             | Field Description                                                                       | Level of Output |
|------------------------|-----------------------------------------------------------------------------------------|-----------------|
| Routing-instance       | Routing instance for IGMP snooping.                                                     | All levels      |
| IGMP packet statistics | Heading for IGMP snooping statistics for all interfaces or for the specified interface. | All levels      |

Table 97: show igmp snooping statistics Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>learning-domain</b>        | Appears at end of "IGMP packets statistics" line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels      |
| <b>IGMP Message type</b>      | Summary of IGMP statistics: <ul style="list-style-type: none"> <li>• <b>Membership Query</b>—Number of membership queries sent and received.</li> <li>• <b>V1 Membership Report</b>—Number of version 1 membership reports sent and received.</li> <li>• <b>DVMRP</b>—Number of DVMRP messages sent or received.</li> <li>• <b>PIM V1</b>—Number of PIM version 1 messages sent or received.</li> <li>• <b>Cisco Trace</b>—Number of Cisco trace messages sent or received.</li> <li>• <b>V2 Membership Report</b>—Number of version 2 membership reports sent or received.</li> <li>• <b>Group Leave</b>—Number of group leave messages sent or received.</li> <li>• <b>Domain Wide Report</b>—Number of domain-wide reports sent or received.</li> <li>• <b>V3 Membership Report</b>—Number of version 3 membership reports sent or received.</li> <li>• <b>Other Unknown types</b>—Number of unknown message types received.</li> <li>• <b>IGMP v3 unsupported type</b>—Number of messages received with unknown and unsupported IGMP version 3 message types.</li> <li>• <b>IGMP v3 source required for SSM</b>—Number of IGMP version 3 messages received that contained no source.</li> <li>• <b>IGMP v3 mode not applicable for SSM</b>—Number of IGMP version 3 messages received that did not contain a mode applicable for source-specific multicast (SSM).</li> </ul> | All levels      |
| <b>Received</b>               | Number of messages received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels      |
| <b>Sent</b>                   | Number of messages sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels      |
| <b>Rx errors</b>              | Number of received packets that contained errors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels      |
| <b>IGMP Global Statistics</b> | Summary of IGMP snooping statistics for all interfaces. <ul style="list-style-type: none"> <li>• <b>Bad Length</b>—Number of messages received with length errors so severe that further classification could not occur.</li> <li>• <b>Bad Checksum</b>—Number of messages received with a bad IP checksum. No further classification was performed.</li> <li>• <b>Rx non-local</b>—Number of messages received from senders that are not local.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels      |

## Sample Output

### show igmp snooping statistics

```

user@host> show igmp snooping statistics
Routing-instance foo

IGMP packet statistics for all interfaces in learning-domain vlan-100

IGMP Message type Received Sent Rx errors

```



|                                     |     |    |    |
|-------------------------------------|-----|----|----|
| Membership Query                    | 89  | 51 | 0  |
| V1 Membership Report                | 0   | 0  | 0  |
| DVMRP                               | 0   | 0  | 0  |
| PIM V1                              | 0   | 0  | 0  |
| Cisco Trace                         | 0   | 0  | 0  |
| V2 Membership Report                | 139 | 0  | 0  |
| Group Leave                         | 0   | 0  | 0  |
| Domain Wide Report                  | 0   | 0  | 0  |
| V3 Membership Report                | 136 | 0  | 0  |
| Other Unknown types                 |     |    | 0  |
| IGMP v3 unsupported type            |     |    | 0  |
| IGMP v3 source required for SSM     |     |    | 23 |
| IGMP v3 mode not applicable for SSM |     |    | 0  |
| IGMP Global Statistics              |     |    |    |
| Bad Length                          | 0   |    |    |
| Bad Checksum                        | 0   |    |    |
| Rx non-local                        | 0   |    |    |

#### Routing-instance bar

IGMP packet statistics for all interfaces in learning-domain vlan-100

| IGMP Message type                   | Received | Sent | Rx errors |
|-------------------------------------|----------|------|-----------|
| Membership Query                    | 89       | 51   | 0         |
| V1 Membership Report                | 0        | 0    | 0         |
| DVMRP                               | 0        | 0    | 0         |
| PIM V1                              | 0        | 0    | 0         |
| Cisco Trace                         | 0        | 0    | 0         |
| V2 Membership Report                | 139      | 0    | 0         |
| Group Leave                         | 0        | 0    | 0         |
| Domain Wide Report                  | 0        | 0    | 0         |
| V3 Membership Report                | 136      | 0    | 0         |
| Other Unknown types                 |          |      | 0         |
| IGMP v3 unsupported type            |          |      | 0         |
| IGMP v3 source required for SSM     |          |      | 23        |
| IGMP v3 mode not applicable for SSM |          |      | 0         |
| IGMP Global Statistics              |          |      |           |
| Bad Length                          | 0        |      |           |
| Bad Checksum                        | 0        |      |           |
| Rx non-local                        | 0        |      |           |

#### show igmp snooping statistics logical-systems all

user@host> show igmp snooping statistics logical-systems all

```
logical-system: default
Bridge: VPLS-6
IGMP Message type Received Sent Rx errors
Membership Query 0 4 0
V1 Membership Report 0 0 0
DVMRP 0 0 0
PIM V1 0 0 0
Cisco Trace 0 0 0
V2 Membership Report 0 0 0
Group Leave 0 0 0
Mtrace Response 0 0 0
Mtrace Request 0 0 0
Domain Wide Report 0 0 0
V3 Membership Report 0 0 0
```

Other Unknown types 0

Learning-Domain: vlan-id 1041 bridge-domain VS-4-BD-1

| IGMP Message type    | Received | Sent | Rx errors |
|----------------------|----------|------|-----------|
| Membership Query     | 0        | 4    | 0         |
| V1 Membership Report | 0        | 0    | 0         |
| DVMRP                | 0        | 0    | 0         |
| PIM V1               | 0        | 0    | 0         |
| Cisco Trace          | 0        | 0    | 0         |
| V2 Membership Report | 0        | 0    | 0         |
| Group Leave          | 0        | 0    | 0         |
| Mtrace Response      | 0        | 0    | 0         |
| Mtrace Request       | 0        | 0    | 0         |
| Domain Wide Report   | 0        | 0    | 0         |
| V3 Membership Report | 0        | 0    | 0         |
| Other Unknown types  |          |      | 0         |

Bridge: VPLS-p2mp

| IGMP Message type    | Received | Sent | Rx errors |
|----------------------|----------|------|-----------|
| Membership Query     | 0        | 2    | 0         |
| V1 Membership Report | 0        | 0    | 0         |
| DVMRP                | 0        | 0    | 0         |
| PIM V1               | 0        | 0    | 0         |
| Cisco Trace          | 0        | 0    | 0         |
| V2 Membership Report | 0        | 0    | 0         |
| Group Leave          | 0        | 0    | 0         |
| Mtrace Response      | 0        | 0    | 0         |
| Mtrace Request       | 0        | 0    | 0         |
| Domain Wide Report   | 0        | 0    | 0         |
| V3 Membership Report | 0        | 0    | 0         |
| Other Unknown types  |          |      | 0         |

Bridge: VS-BD-1

| IGMP Message type    | Received | Sent | Rx errors |
|----------------------|----------|------|-----------|
| Membership Query     | 0        | 6    | 0         |
| V1 Membership Report | 0        | 0    | 0         |
| DVMRP                | 0        | 0    | 0         |
| PIM V1               | 0        | 0    | 0         |
| Cisco Trace          | 0        | 0    | 0         |
| V2 Membership Report | 0        | 0    | 0         |
| Group Leave          | 0        | 0    | 0         |
| Mtrace Response      | 0        | 0    | 0         |
| Mtrace Request       | 0        | 0    | 0         |
| Domain Wide Report   | 0        | 0    | 0         |
| V3 Membership Report | 0        | 0    | 0         |
| Other Unknown types  |          |      | 0         |

### show igmp snooping statistics interface (Bridge Domains Configured)

user@host> show igmp snooping statistics interface

Bridge: bridge-domain1

IGMP interface packet statistics for ge-2/0/8.0

| IGMP Message type    | Received | Sent | Rx errors |
|----------------------|----------|------|-----------|
| Membership Query     | 0        | 2    | 0         |
| V1 Membership Report | 0        | 0    | 0         |
| DVMRP                | 0        | 0    | 0         |
| PIM V1               | 0        | 0    | 0         |
| Cisco Trace          | 0        | 0    | 0         |
| V2 Membership Report | 0        | 0    | 0         |

|                      |   |   |   |
|----------------------|---|---|---|
| Group Leave          | 0 | 0 | 0 |
| Mtrace Response      | 0 | 0 | 0 |
| Mtrace Request       | 0 | 0 | 0 |
| Domain Wide Report   | 0 | 0 | 0 |
| V3 Membership Report | 0 | 0 | 0 |
| Other Unknown types  |   |   | 0 |

Bridge: bridge-domain2

IGMP interface packet statistics for ge-2/0/8.0

| IGMP Message type    | Received | Sent | Rx errors |
|----------------------|----------|------|-----------|
| Membership Query     | 0        | 2    | 0         |
| V1 Membership Report | 0        | 0    | 0         |
| DVMRP                | 0        | 0    | 0         |
| PIM V1               | 0        | 0    | 0         |
| Cisco Trace          | 0        | 0    | 0         |
| V2 Membership Report | 0        | 0    | 0         |
| Group Leave          | 0        | 0    | 0         |
| Mtrace Response      | 0        | 0    | 0         |
| Mtrace Request       | 0        | 0    | 0         |
| Domain Wide Report   | 0        | 0    | 0         |
| V3 Membership Report | 0        | 0    | 0         |
| Other Unknown types  |          |      | 0         |

## show igmp statistics

---

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                               | <a href="#">Syntax on page 1522</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1522</a>                                                                                                                                                                                                                                                                                                            |
| Syntax                                       | <code>show igmp statistics</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                  |
| Syntax (EX Series Switch and the QFX Series) | <code>show igmp statistics</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code>                                                                                                                                                                                                                                                                                            |
| Release Information                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                    |
| Description                                  | Display Internet Group Management Protocol (IGMP) statistics.                                                                                                                                                                                                                                                                                                                                                               |
| Options                                      | <b>none</b> —Display IGMP statistics for all interfaces.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>interface <i>interface-name</i></b> —(Optional) Display IGMP statistics about the specified interface only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| Required Privilege Level                     | view                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Related Documentation                        | <ul style="list-style-type: none"><li>• <a href="#">clear igmp statistics on page 1457</a></li></ul>                                                                                                                                                                                                                                                                                                                        |
| List of Sample Output                        | <a href="#">show igmp statistics on page 1523</a><br><a href="#">show igmp statistics interface on page 1524</a>                                                                                                                                                                                                                                                                                                            |
| Output Fields                                | <a href="#">Table 98 on page 1522</a> describes the output fields for the <b>show igmp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                      |

Table 98: show igmp statistics Output Fields

| Field Name             | Field Description                                                                          |
|------------------------|--------------------------------------------------------------------------------------------|
| IGMP packet statistics | Heading for IGMP packet statistics for all interfaces or for the specified interface name. |

---

Table 98: show igmp statistics Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IGMP Message type      | <p>Summary of IGMP statistics:</p> <ul style="list-style-type: none"> <li>• <b>Membership Query</b>—Number of membership queries sent and received.</li> <li>• <b>V1 Membership Report</b>—Number of version 1 membership reports sent and received.</li> <li>• <b>DVMRP</b>—Number of DVMRP messages sent or received.</li> <li>• <b>PIM V1</b>—Number of PIM version 1 messages sent or received.</li> <li>• <b>Cisco Trace</b>—Number of Cisco trace messages sent or received.</li> <li>• <b>V2 Membership Report</b>—Number of version 2 membership reports sent or received.</li> <li>• <b>Group Leave</b>—Number of group leave messages sent or received.</li> <li>• <b>Mtrace Response</b>—Number of Mtrace response messages sent or received.</li> <li>• <b>Mtrace Request</b>—Number of Mtrace request messages sent or received.</li> <li>• <b>Domain Wide Report</b>—Number of domain-wide reports sent or received.</li> <li>• <b>V3 Membership Report</b>—Number of version 3 membership reports sent or received.</li> <li>• <b>Other Unknown types</b>—Number of unknown message types received.</li> <li>• <b>IGMP v3 unsupported type</b>—Number of messages received with unknown and unsupported IGMP version 3 message types.</li> <li>• <b>IGMP v3 source required for SSM</b>—Number of IGMP version 3 messages received that contained no source.</li> <li>• <b>IGMP v3 mode not applicable for SSM</b>—Number of IGMP version 3 messages received that did not contain a mode applicable for source-specific multicast (SSM).</li> </ul> |
| Received               | Number of messages received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Sent                   | Number of messages sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Rx errors              | Number of received packets that contained errors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| IGMP Global Statistics | <p>Summary of IGMP statistics for all interfaces.</p> <ul style="list-style-type: none"> <li>• <b>Bad Length</b>—Number of messages received with length errors so severe that further classification could not occur.</li> <li>• <b>Bad Checksum</b>—Number of messages received with a bad IP checksum. No further classification was performed.</li> <li>• <b>Bad Receive If</b>—Number of messages received on an interface not enabled for IGMP.</li> <li>• <b>Rx non-local</b>—Number of messages received from senders that are not local.</li> <li>• <b>Timed out</b>—Number of groups that timed out as a result of not receiving an explicit leave message.</li> <li>• <b>Rejected Report</b>—Number of reports dropped because of the IGMP group policy.</li> <li>• <b>Total Interfaces</b>—Number of interfaces configured to support IGMP.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### show igmp statistics

```

user@host> show igmp statistics
IGMP packet statistics for all interfaces
IGMP Message type Received Sent Rx errors
Membership Query 8883 459 0
V1 Membership Report 0 0 0

```

|                                     |      |   |   |
|-------------------------------------|------|---|---|
| DVMRP                               | 0    | 0 | 0 |
| PIM V1                              | 0    | 0 | 0 |
| Cisco Trace                         | 0    | 0 | 0 |
| V2 Membership Report                | 0    | 0 | 0 |
| Group Leave                         | 0    | 0 | 0 |
| Mtrace Response                     | 0    | 0 | 0 |
| Mtrace Request                      | 0    | 0 | 0 |
| Domain Wide Report                  | 0    | 0 | 0 |
| V3 Membership Report                | 0    | 0 | 0 |
| Other Unknown types                 |      |   | 0 |
| IGMP v3 unsupported type            |      |   | 0 |
| IGMP v3 source required for SSM     |      |   | 0 |
| IGMP v3 mode not applicable for SSM |      |   | 0 |
| IGMP Global Statistics              |      |   |   |
| Bad Length                          | 0    |   |   |
| Bad Checksum                        | 0    |   |   |
| Bad Receive If                      | 0    |   |   |
| Rx non-local                        | 1227 |   |   |
| Timed out                           | 0    |   |   |
| Rejected Report                     | 0    |   |   |
| Total Interfaces                    | 2    |   |   |

#### show igmp statistics interface

```
user@host> show igmp statistics interface fe-1/0/1.0
IGMP interface packet statistics for fe-1/0/1.0
IGMP Message type Received Sent Rx errors
Membership Query 0 230 0
V1 Membership Report 0 0 0
```

## show mld group

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mld group<br><brief   detail><br><group-name><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Display information about Multicast Listener Discovery (MLD) group membership.                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about all MLD groups.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>group-name</b>—(Optional) Display MLD information about the specified group.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear mld membership on page 1459</a></li> </ul>                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <p><a href="#">show mld group (Include Mode) on page 1526</a></p> <p><a href="#">show mld group (Exclude Mode) on page 1527</a></p> <p><a href="#">show mld group brief on page 1527</a></p> <p><a href="#">show mld group detail (Include Mode) on page 1527</a></p> <p><a href="#">show mld group detail (Exclude Mode) on page 1528</a></p>                                                          |
| <b>Output Fields</b>            | <a href="#">Table 99 on page 1525</a> describes the output fields for the <b>show mld group</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                        |

**Table 99: show mld group Output Fields**

| Field Name              | Field Description                                                                                                                | Level of Output |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Interface</b>        | Name of the interface that received the MLD membership report; <b>local</b> means that the local router joined the group itself. | All levels      |
| <b>Group</b>            | Group address.                                                                                                                   | All levels      |
| <b>Source</b>           | Source address.                                                                                                                  | All levels      |
| <b>Group Mode</b>       | Mode the SSM group is operating in: <b>Include</b> or <b>Exclude</b> .                                                           | All levels      |
| <b>Last reported by</b> | Address of the host that last reported membership in this group.                                                                 | All levels      |

Table 99: show mld group Output Fields (*continued*)

| Field Name     | Field Description                                                                                                                                                                                                         | Level of Output |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Source timeout | Time remaining until the group traffic is no longer forwarded. The timer is refreshed when a listener in include mode sends a report. A group in exclude mode or configured as a static group displays a zero timer.      | detail          |
| Timeout        | Time remaining until the group membership is removed.                                                                                                                                                                     | brief none      |
| Group timeout  | Time remaining until a group in exclude mode moves to include mode. The timer is refreshed when a listener in exclude mode sends a report. A group in include mode or configured as a static group displays a zero timer. | detail          |
| Type           | Type of group membership: <ul style="list-style-type: none"> <li>• <b>Dynamic</b>—Host reported the membership.</li> <li>• <b>Static</b>—Membership is configured.</li> </ul>                                             | All levels      |

## Sample Output

### show mld group (Include Mode)

```

user@host> show mld group
Interface: fe-0/1/2.0
 Group: ff02::1:ff05:1a67
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 245 Type: Dynamic
 Group: ff02::1:ffa8:c35e
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 241 Type: Dynamic
 Group: ff02::2:43e:d7f6
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 244 Type: Dynamic
 Group: ff05::2
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 244 Type: Dynamic
Interface: local
 Group: ff02::2
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic
 Group: ff02::16
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic

```



### show mld group (Exclude Mode)

```

user@host> show mld group
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
 Group: ff02::6
 Source: ::
 Last reported by: fe80::21f:12ff:feb6:4b3a
 Timeout: 245 Type: Dynamic
 Group: ff02::16
 Source: ::
 Last reported by: fe80::21f:12ff:feb6:4b3a
 Timeout: 28 Type: Dynamic
Interface: local
 Group: ff02::2
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic
 Group: ff02::16
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic

```

### show mld group brief

The output for the **show mld group brief** command is identical to that for the **show mld group** command. For sample output, see [show mld group \(Include Mode\) on page 1526](#) and [show mld group \(Exclude Mode\) on page 1527](#).

### show mld group detail (Include Mode)

```

user@host> show mld group detail
Interface: fe-0/1/2.0
 Group: ff02::1:ff05:1a67
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 224 Type: Dynamic
 Group: ff02::1:ffa8:c35e
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 220 Type: Dynamic
 Group: ff02::2:43e:d7f6
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 223 Type: Dynamic
 Group: ff05::2
 Group mode: Include
 Source: ::
 Last reported by: fe80::2e0:81ff:fe05:1a67
 Timeout: 223 Type: Dynamic
Interface: so-1/0/1.0
 Group: ff02::2
 Group mode: Include
 Source: ::
 Last reported by: fe80::280:42ff:fe15:f445
 Timeout: 258 Type: Dynamic
Interface: local

```

```
Group: ff02::2
 Group mode: Include
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic
Group: ff02::16
 Source: ::
 Last reported by: Local
 Timeout: 0 Type: Dynamic
```

#### show mld group detail (Exclude Mode)

```
user@host> show mld group detail
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
 Group: ff02::6
 Group mode: Exclude
 Source: ::
 Source timeout: 0
 Last reported by: fe80::21f:12ff:feb6:4b3a
 Group timeout: 226 Type: Dynamic
 Group: ff02::16
 Group mode: Exclude
 Source: ::
 Source timeout: 0
 Last reported by: fe80::21f:12ff:feb6:4b3a
 Group timeout: 246 Type: Dynamic
Interface: local
 Group: ff02::2
 Group mode: Exclude
 Source: ::
 Source timeout: 0
 Last reported by: Local
 Group timeout: 0 Type: Dynamic
 Group: ff02::16
 Group mode: Exclude
 Source: ::
 Source timeout: 0
 Last reported by: Local
 Group timeout: 0 Type: Dynamic
```

## show mld interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mld interface<br><brief   detail><br><interface-name><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Display information about Multicast Listener Discovery (MLD)-enabled interfaces.                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about all MLD-enabled interfaces.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>interface-name</b>—(Optional) Display information about the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear mld membership on page 1459</a></li> </ul>                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">show mld interface on page 1531</a><br><a href="#">show mld interface brief on page 1531</a><br><a href="#">show mld interface detail on page 1532</a><br><a href="#">show mld interface &lt;interface-name&gt; on page 1532</a>                                                                                                                                                                            |
| <b>Output Fields</b>            | <p><a href="#">Table 100 on page 1529</a> describes the output fields for the <b>show mld interface</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                            |

**Table 100: show mld interface Output Fields**

| Field Name            | Field Description                                                                              | Level of Output |
|-----------------------|------------------------------------------------------------------------------------------------|-----------------|
| <b>Interface</b>      | Name of the interface.                                                                         | All levels      |
| <b>Querier</b>        | Address of the router that has been elected to send membership queries.                        | All levels      |
| <b>State</b>          | State of the interface: <b>Up</b> or <b>Down</b> .                                             | All levels      |
| <b>SSM Map Policy</b> | Name of the source-specific multicast (SSM) map policy that has been applied to the interface. | All levels      |
| <b>SSM Map Policy</b> | Name of the source-specific multicast (SSM) map policy at the MLD interface.                   | All levels      |
| <b>Timeout</b>        | How long until the MLD querier is declared to be unreachable, in seconds.                      | All levels      |
| <b>Version</b>        | MLD version being used on the interface: 1 or 2.                                               | All levels      |

Table 100: show mld interface Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Groups</b>             | Number of groups on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels      |
| <b>Passive</b>            | <p>State of the passive mode option:</p> <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates that the router can run IGMP or MLD on the interface but not send or receive control traffic such as IGMP or MLD reports, queries, and leaves.</li> <li>• <b>Off</b>—Indicates that the router can run IGMP or MLD on the interface and send or receive control traffic such as IGMP or MLD reports, queries, and leaves.</li> </ul> <p>The <b>passive</b> statement enables you to selectively activate up to two out of a possible three available query or control traffic options. When enabled, the following options appear after the <b>on</b> state declaration:</p> <ul style="list-style-type: none"> <li>• <b>send-general-query</b>—The interface sends general queries.</li> <li>• <b>send-group-query</b>—The interface sends group-specific and group-source-specific queries.</li> <li>• <b>allow-receive</b>—The interface receives control traffic</li> </ul> | All levels      |
| <b>OIF map</b>            | Name of the OIF map associated to the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels      |
| <b>SSM map</b>            | Name of the source-specific multicast (SSM) map used on the interface, if configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels      |
| <b>Group limit</b>        | Maximum number of groups allowed on the interface. Any memberships requested after the limit is reached are rejected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels      |
| <b>Group threshold</b>    | <p>Configured threshold at which a warning message is generated.</p> <p>This threshold is based on a percentage of groups received on the interface. If the number of groups received reaches the configured threshold, the device generates a warning message.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Group log-interval</b> | Time (in seconds) between consecutive log messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Immediate Leave</b>    | <p>State of the immediate leave option:</p> <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates that the router removes a host from the multicast group as soon as the router receives a multicast listener done message from a host associated with the interface.</li> <li>• <b>Off</b>—Indicates that after receiving a multicast listener done message, instead of removing a host from the multicast group immediately, the router sends a group query to determine if another receiver responds.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels      |

Table 100: show mld interface Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Configured Parameters</b> | Information configured by the user. <ul style="list-style-type: none"> <li>• <b>MLD Query Interval (.1 secs)</b>—Interval at which this router sends membership queries when it is the querier.</li> <li>• <b>MLD Query Response Interval (.1 secs)</b>—Time that the router waits for a report in response to a general query.</li> <li>• <b>MLD Last Member Query Interval (.1 secs)</b>—Time that the router waits for a report in response to a group-specific query.</li> <li>• <b>MLD Robustness Count</b>—Number of times the router retries a query.</li> </ul> | All levels      |
| <b>Derived Parameters</b>    | Derived information. <ul style="list-style-type: none"> <li>• <b>MLD Membership Timeout (.1 secs)</b>—Timeout period for group membership. If no report is received for these groups before the timeout expires, the group membership will be removed.</li> <li>• <b>MLD Other Querier Present Timeout (.1 secs)</b>—Time that the router waits for the IGMP querier to send a query.</li> </ul>                                                                                                                                                                        | All levels      |

## Sample Output

### show mld interface

```

user@host> show mld interface
Interface: fe-0/0/0
 Querier: None
 State: Up Timeout: 0 Version: 1 Groups: 0
 SSM Map Policy: ssm-policy-A
Interface: at-0/3/1.0
 Querier: 8038::c0a8:c345
 State: Up Timeout: None Version: 1 Groups: 0
 SSM Map Policy: ssm-policy-B
Interface: fe-1/0/1.0
 Querier: ::192.168.195.73
 State: Up Timeout: None Version: 1 Groups: 3
 SSM Map Policy: ssm-policy-C
 SSM map: ipv6map1
Immediate Leave: On

Configured Parameters:
MLD Query Interval (.1 secs): 1250
MLD Query Response Interval (.1 secs): 100
MLD Last Member Query Interval (.1 secs): 10
MLD Robustness Count: 2

Derived Parameters:
MLD Membership Timeout (.1secs): 2600
MLD Other Querier Present Timeout (.1 secs): 2550

```

### show mld interface brief

The output for the **show mld interface brief** command is identical to that for the **show mld interface** command. For sample output, see [show mld interface on page 1531](#).

### show mld interface detail

The output for the **show mld interface detail** command is identical to that for the **show mld interface** command. For sample output, see [show mld interface on page 1531](#).

### show mld interface <interface-name>

```
user@host# show mld interface ge-3/2/0.0
Interface: ge-3/2/0.0
Querier: 20.1.1.1
State: Up Timeout: None Version: 3 Groups: 1
Group limit: 8
Group threshold: 60
Group log-interval: 10
Immediate leave: Off
Promiscuous mode: Off
```

## show mld statistics

|                                 |                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mld statistics<br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Display information about Multicast Listener Discovery (MLD) statistics.                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>none</b>—Display MLD statistics for all interfaces.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display statistics about the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear mld statistics on page 1460</a></li> </ul>                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">show mld statistics on page 1534</a><br><a href="#">show mld statistics interface on page 1535</a>                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | <p><a href="#">Table 101 on page 1533</a> describes the output fields for the <b>show mld statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                        |

**Table 101: show mld statistics Output Fields**

| Field Name | Field Description                                 |
|------------|---------------------------------------------------|
| Received   | Number of received packets.                       |
| Sent       | Number of transmitted packets.                    |
| Rx errors  | Number of received packets that contained errors. |

Table 101: show mld statistics Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MLD Message type</b>      | Summary of MLD statistics. <ul style="list-style-type: none"> <li>• <b>Listener Query (v1/v2)</b>—Number of membership queries sent and received.</li> <li>• <b>Listener Report (v1)</b>—Number of version 1 membership reports sent and received.</li> <li>• <b>Listener Done (v1/v2)</b>—Number of Listener Done messages sent and received.</li> <li>• <b>Listener Report (v2)</b>—Number of version 2 membership reports sent and received.</li> <li>• <b>Other Unknown types</b>—Number of unknown message types received.</li> <li>• <b>MLD v2 source required for SSM</b>—Number of MLD version 2 messages received that contained no source.</li> <li>• <b>MLD v2 mode not applicable for SSM</b>—Number of MLD version 2 messages received that did not contain a mode applicable for source-specific multicast (SSM).</li> </ul>          |
| <b>MLD Global Statistics</b> | Summary of MLD statistics for all interfaces. <ul style="list-style-type: none"> <li>• <b>Bad Length</b>—Number of messages received with length errors so severe that further classification could not occur.</li> <li>• <b>Bad Checksum</b>—Number of messages received with an invalid IP checksum. No further classification was performed.</li> <li>• <b>Bad Receive If</b>—Number of messages received on an interface not enabled for MLD.</li> <li>• <b>Rx non-local</b>—Number of messages received from nonlocal senders.</li> <li>• <b>Timed out</b>—Number of groups that timed out as a result of not receiving an explicit leave message.</li> <li>• <b>Rejected Report</b>—Number of reports dropped because of the MLD group policy.</li> <li>• <b>Total Interfaces</b>—Number of interfaces configured to support IGMP.</li> </ul> |

## Sample Output

### show mld statistics

```

user@host> show mld statistics
MLD packet statistics for all interfaces
MLD Message type Received Sent Rx errors
Listener Query (v1/v2) 0 2 0
Listener Report (v1) 0 0 0
Listener Done (v1/v2) 0 0 0
Listener Report (v2) 0 0 0
Other Unknown types 0 0 0
MLD v2 source required for SSM 2
MLD v2 mode not applicable for SSM 0

MLD Global Statistics
Bad Length 0
Bad Checksum 0
Bad Receive If 0
Rx non-local 0
Timed out 0

```



|                  |   |
|------------------|---|
| Rejected Report  | 0 |
| Total Interfaces | 2 |

#### show mld statistics interface

```
user@host> show mld statistics interface fe-1/0/1.0
MLD interface packet statistics for fe-1/0/1.0
MLD Message type Received Sent Rx errors
Listener Query (v1/v2) 0 2 0
Listener Report (v1) 0 0 0
Listener Done (v1/v2) 0 0 0
Listener Report (v2) 0 0 0
Other Unknown types 0 0 0
MLD v2 source required for SSM 2
MLD v2 mode not applicable for SSM 0

MLD Global Statistics
Bad Length 0
Bad Checksum 0
Bad Receive If 0
Rx non-local 0
Timed out 0
Rejected Report 0
Total Interfaces 2
```

## show msdp

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show msdp &lt;brief   detail&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;peer <i>peer-address</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display Multicast Source Discovery Protocol (MSDP) information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>none</b>—Display standard MSDP information for all routing instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>peer <i>peer-address</i></b>—(Optional) Display information about the specified peer only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show msdp source on page 1538</a></li> <li>• <a href="#">show msdp source-active on page 1540</a></li> <li>• <a href="#">show msdp statistics on page 1543</a></li> </ul>                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <p><a href="#">show msdp on page 1537</a></p> <p><a href="#">show msdp brief on page 1537</a></p> <p><a href="#">show msdp detail on page 1537</a></p>                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | Table 102 on page 1536 describes the output fields for the <b>show msdp</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                |

Table 102: show msdp Output Fields

| Field Name    | Field Description                                                                        | Level of Output |
|---------------|------------------------------------------------------------------------------------------|-----------------|
| Peer address  | IP address of the peer.                                                                  | All levels      |
| Local address | Local address of the peer.                                                               | All levels      |
| State         | Status of the MSDP connection: <b>Listen</b> , <b>Established</b> , or <b>Inactive</b> . | All levels      |
| Last up/down  | Time at which the most recent peer-state change occurred.                                | All levels      |

Table 102: show msdp Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                   | Level of Output |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Peer-Group           | Peer group name.                                                                                                                                                                    | All levels      |
| SA Count             | Number of source-active cache entries advertised by each peer that were accepted, compared to the number that were received, in the format <i>number-accepted/number-received</i> . | All levels      |
| Peer Connect Retries | Number of peer connection retries.                                                                                                                                                  | detail          |
| State timer expires  | Number of seconds before another message is sent to a peer.                                                                                                                         | detail          |
| Peer Times out       | Number of seconds to wait for a response from the peer before the peer is declared unavailable.                                                                                     | detail          |
| SA accepted          | Number of entries in the source-active cache accepted from the peer.                                                                                                                | detail          |
| SA received          | Number of entries in the source-active cache received by the peer.                                                                                                                  | detail          |

## Sample Output

### show msdp

```

user@host> show msdp
Peer address Local address State Last up/down Peer-Group SA Count
198.32.8.193 198.32.8.195 Established 5d 19:25:44 North23 120/150
198.32.8.194 198.32.8.195 Established 3d 19:27:27 North23 300/345
198.32.8.196 198.32.8.195 Established 5d 19:39:36 North23 10/13
198.32.8.197 198.32.8.195 Established 5d 19:32:27 North23 5/6
198.32.8.198 198.32.8.195 Established 3d 19:33:04 North23 2305/3000

```

### show msdp brief

The output for the **show msdp brief** command is identical to that for the **show msdp** command. For sample output, see [show msdp on page 1537](#).

### show msdp detail

```

user@host> show msdp detail
Peer: 10.255.70.15
Local address: 10.255.70.19
State: Established
Peer Connect Retries: 0
State timer expires: 22
Peer Times out: 49
SA accepted: 0
SA received: 0

```

## show msdp source

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show msdp source</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;source-address&gt;</code>                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display multicast sources learned from Multicast Source Discovery Protocol (MSDP).                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <b>none</b> —Display standard MSDP source information for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display information for the specified instance only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>source-address</b> —(Optional) IP address and optional prefix length. Display information for the specified source address only. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp on page 1536</a></li><li>• <a href="#">show msdp source-active on page 1540</a></li><li>• <a href="#">show msdp statistics on page 1543</a></li></ul>                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show msdp source on page 1539</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Output Fields** Table 103 on page 1539 describes the output fields for the **show msdp source** command. Output fields are listed in the approximate order in which they appear.

**Table 103: show msdp source Output Fields**

| Field Name     | Field Description                                                                                                                                                                                                                                                       |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source address | IP address of the source.                                                                                                                                                                                                                                               |
| /Len           | Length of the prefix for this IP address.                                                                                                                                                                                                                               |
| Type           | Discovery method for this multicast source: <ul style="list-style-type: none"> <li>• <b>Configured</b>—Source-active limit explicitly configured for this source.</li> <li>• <b>Dynamic</b>—Source-active limit established when this source was discovered.</li> </ul> |
| Maximum        | Source-active limit applied to this source.                                                                                                                                                                                                                             |
| Threshold      | Source-active threshold applied to this source.                                                                                                                                                                                                                         |
| Exceeded       | Number of source-active messages received from this source exceeding the established maximum.                                                                                                                                                                           |

## Sample Output

**show msdp source**

```

user@host> show msdp source
Source address /Len Type Maximum Threshold Exceeded
0.0.0.0 /0 Configured 5 none 0
10.1.0.0 /16 Configured 500 none 0
10.1.1.1 /32 Configured 10000 none 0
10.1.1.2 /32 Dynamic 6936 none 0
10.1.5.5 /32 Dynamic 500 none 123
10.2.1.1 /32 Dynamic 2 none 0

```

## show msdp source-active

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show msdp source-active</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;group <i>group</i>&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;local&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;originator <i>originator</i>&gt;</code><br><code>&lt;peer <i>peer-address</i>&gt;</code><br><code>&lt;source <i>source-address</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Display the Multicast Source Discovery Protocol (MSDP) source-active cache.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <b>none</b> —Display standard MSDP source-active cache information for all routing instances.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>group <i>group</i></b> —(Optional) Display source-active cache information for the specified group.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display information for the specified instance.<br><br><b>local</b> —(Optional) Display all source-active caches originated by this router.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>originator <i>originator</i></b> —(Optional) Display information about the peer that originated the source-active cache entries.<br><br><b>peer <i>peer-address</i></b> —(Optional) Display the source-active cache of the specified peer.<br><br><b>source <i>source-address</i></b> —(Optional) Display the source-active cache of the specified source. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp on page 1536</a></li><li>• <a href="#">show msdp source on page 1538</a></li><li>• <a href="#">show msdp statistics on page 1543</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show msdp source-active on page 1541</a><br><a href="#">show msdp source-active brief on page 1542</a><br><a href="#">show msdp source-active detail on page 1542</a><br><a href="#">show msdp source-active source on page 1542</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Output Fields** Table 104 on page 1541 describes the output fields for the **show msdp source-active** command. Output fields are listed in the approximate order in which they appear.

**Table 104: show msdp source-active Output Fields**

| Field Name                              | Field Description                                                                                                                                          |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Global active source limit exceeded     | Number of times all peers have exceeded configured active source limits.                                                                                   |
| Global active source limit maximum      | Configured number of active source messages accepted by the device.                                                                                        |
| Global active source limit threshold    | Configured threshold for applying random early discard (RED) to drop some but not all MSDP active source messages.                                         |
| Global active source limit log-warning  | Threshold at which a warning message is logged (percentage of the number of active source messages accepted by the device).                                |
| Global active source limit log interval | Time (in seconds) between consecutive log messages.                                                                                                        |
| Group address                           | Multicast address of the group.                                                                                                                            |
| Source address                          | IP address of the source.                                                                                                                                  |
| Peer address                            | IP address of the peer.                                                                                                                                    |
| Originator                              | Router ID configured on the source of the rendezvous point (RP) that originated the message, or the loopback address when the router ID is not configured. |
| Flags                                   | Flags: <b>Accept</b> , <b>Reject</b> , or <b>Filtered</b> .                                                                                                |

## Sample Output

### show msdp source-active

```

user@host> show msdp source-active
Group address Source address Peer address Originator Flags
230.0.0.0 192.168.195.46 local 10.255.14.30 Accept
230.0.0.1 192.168.195.46 local 10.255.14.30 Accept
230.0.0.2 192.168.195.46 local 10.255.14.30 Accept
230.0.0.3 192.168.195.46 local 10.255.14.30 Accept
230.0.0.4 192.168.195.46 local 10.255.14.30 Accept

```

### show msdp source-active brief

The output for the **show msdp source-active brief** command is identical to that for the **show msdp source-active** command. For sample output, see [show msdp source-active on page 1541](#).

### show msdp source-active detail

The output for the **show msdp source-active detail** command is identical to that for the **show msdp source-active** command. For sample output, see [show msdp source-active on page 1541](#).

### show msdp source-active source

```
user@host> show msdp source-active source 192.168.215.246
```

```
Global active source limit exceeded: 0
```

```
Global active source limit maximum: 25000
```

```
Global active source limit threshold: 24000
```

```
Global active source limit log-warning: 100
```

```
Global active source limit log interval: 0
```

| Group address | Source address  | Peer address   | Originator     | Flags  |
|---------------|-----------------|----------------|----------------|--------|
| 226.2.2.1     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.3     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.4     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.5     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.7     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.10    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.11    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.13    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.14    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.15    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |



## show msdp statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show msdp statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><peer <i>peer-address</i> >                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display statistics about Multicast Source Discovery Protocol (MSDP) peers.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b>none</b> —Display statistics about all MSDP peers for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display statistics about a specific MSDP instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>peer <i>peer-address</i></b> —(Optional) Display statistics about a particular MSDP peer. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear msdp statistics on page 1462</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>    | <a href="#">show msdp statistics on page 1545</a><br><a href="#">show msdp statistics peer on page 1545</a>                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | <a href="#">Table 105 on page 1543</a> describes the output fields for the <b>show msdp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                     |

**Table 105: show msdp statistics Output Fields**

| Field Name                              | Field Description                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Global active source limit exceeded     | Number of times all peers have exceeded configured active source limits.                                                    |
| Global active source limit maximum      | Configured number of active source messages accepted by the device.                                                         |
| Global active source limit threshold    | Configured threshold for applying random early discard (RED) to drop some but not all MSDP active source messages.          |
| Global active source limit log-warning  | Threshold at which a warning message is logged (percentage of the number of active source messages accepted by the device). |
| Global active source limit log interval | Time (in seconds) between consecutive log messages.                                                                         |

Table 105: show msdp statistics Output Fields (*continued*)

| Field Name                                        | Field Description                                                                                                                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peer</b>                                       | Address of peer.                                                                                                                                                                                      |
| <b>Last State Change</b>                          | How long ago the peer state changed.                                                                                                                                                                  |
| <b>Last message received from the peer</b>        | How long ago the last message was received from the peer.                                                                                                                                             |
| <b>RPF Failures</b>                               | Number of reverse path forwarding (RPF) failures.                                                                                                                                                     |
| <b>Remote Closes</b>                              | Number of times the remote peer closed.                                                                                                                                                               |
| <b>Peer Timeouts</b>                              | Number of peer timeouts.                                                                                                                                                                              |
| <b>SA messages sent</b>                           | Number of source-active messages sent.                                                                                                                                                                |
| <b>SA messages received</b>                       | Number of source-active messages received.                                                                                                                                                            |
| <b>SA request messages sent</b>                   | Number of source-active request messages sent.                                                                                                                                                        |
| <b>SA request messages received</b>               | Number of source-active request messages received.                                                                                                                                                    |
| <b>SA response messages sent</b>                  | Number of source-active response messages sent.                                                                                                                                                       |
| <b>SA response messages received</b>              | Number of source-active response messages received.                                                                                                                                                   |
| <b>SA messages with zero Entry Count received</b> | Entry Count is a field within SA message that defines how many source/group tuples are present in the SA message. The counter is incremented each time an SA with an Entry Count of zero is received. |
| <b>Active source exceeded</b>                     | Number of times this peer has exceeded configured source-active limits.                                                                                                                               |
| <b>Active source Maximum</b>                      | Configured number of active source messages accepted by this peer.                                                                                                                                    |
| <b>Active source threshold</b>                    | Configured threshold on this peer for applying random early discard (RED) to drop some but not all MSDP active source messages.                                                                       |
| <b>Active source log-warning</b>                  | Configured threshold on this peer at which a warning message is logged (percentage of the number of active source messages accepted by the device).                                                   |
| <b>Active source log-interval</b>                 | Time (in seconds) between consecutive log messages on this peer.                                                                                                                                      |
| <b>Keepalive messages sent</b>                    | Number of keepalive messages sent.                                                                                                                                                                    |

Table 105: show msdp statistics Output Fields (*continued*)

| Field Name                  | Field Description                      |
|-----------------------------|----------------------------------------|
| Keepalive messages received | Number of keepalive messages received. |
| Unknown messages received   | Number of unknown messages received.   |
| Error messages received     | Number of error messages received.     |

## Sample Output

### show msdp statistics

```

user@host> show msdp statistics
Global active source limit exceeded: 0
Global active source limit maximum: 10
Global active source limit threshold: 8
Global active source limit log-warning: 60
Global active source limit log interval: 60

Peer: 10.255.245.39
Last State Change: 11:54:49 (00:24:59)
Last message received from peer: 11:53:32 (00:26:16)
RPF Failures: 0
Remote Closes: 0
Peer Timeouts: 0
SA messages sent: 376
SA messages received: 459
SA messages with zero Entry Count received: 0
SA request messages sent: 0
SA request messages received: 0
SA response messages sent: 0
SA response messages received: 0
Active source exceeded: 0
Active source Maximum: 10
Active source threshold: 8
Active source log-warning: 60
Active source log-interval 120
Keepalive messages sent: 17
Keepalive messages received: 19
Unknown messages received: 0
Error messages received: 0

```

### show msdp statistics peer

```

user@host> show msdp statistics peer 10.255.182.140
Peer: 10.255.182.140
 Last State Change: 8:19:23 (00:01:08)
 Last message received from peer: 8:20:05 (00:00:26)
 RPF Failures: 0
 Remote Closes: 0
 Peer Timeouts: 0
 SA messages sent: 17
 SA messages received: 16
 SA request messages sent: 0
 SA request messages received: 0

```

SA response messages sent: 0  
SA response messages received: 0  
Active source exceeded: 20  
Active source Maximum: 10  
Active source threshold: 8  
Active source log-warning: 60  
Active source log-interval: 120  
Keepalive messages sent: 0  
Keepalive messages received: 0  
Unknown messages received: 0  
Error messages received: 0

## show multicast backup-pe-groups

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show multicast backup-pe-groups<br><address <i>pe-address</i> ><br><group <i>group-name</i> ><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display backup PE router group information when ingress PE redundancy is configured. Ingress PE redundancy provides a backup resource when point-to-multipoint LSPs are configured for multicast distribution.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about all backup PE groups.</p> <p><b>address <i>pe-address</i></b>—(Optional) Display the groups that a PE address is associated with.</p> <p><b>group <i>group</i></b>—(Optional) Display the backup PE group information for a particular group.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display backup PE group information for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show multicast backup-pe-groups on page 1548</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | <a href="#">Table 106 on page 1547</a> describes the output fields for the <b>show multicast backup-pe-groups</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 106: show multicast backup-pe-groups Output Fields**

| Field Name      | Field Description                                                                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Backup PE Group | Group name.                                                                                                                                                          |
| Designated PE   | Primary PE router. Address of the PE router that is currently forwarding traffic on the static route.                                                                |
| Transitions     | Number of times that the designated PE router has transitioned from the most eligible PE router to a backup PE router and back again to the most eligible PE router. |
| Last Transition | Time of the most recent transition.                                                                                                                                  |
| Local Address   | Address of the local PE router.                                                                                                                                      |
| Backup PE List  | List of PE routers that are configured to be backups for the group.                                                                                                  |

## Sample Output

### show multicast backup-pe-groups

```
user@host> show multicast backup-pe-groups
Instance: master

Backup PE group: b1
 Designated PE: 10.255.165.7
 Transitions: 1
 Last Transition: 03:15:01
 Local Address: 10.255.165.7
 Backup PE List:
 10.255.165.8

Backup PE group: b2
 Designated PE: 10.255.165.7
 Transitions: 2
 Last Transition: 02:58:20
 Local Address: 10.255.165.7
 Backup PE List:
 10.255.165.9
 10.255.165.8
```

## show multicast flow-map

|                                                     |                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1549</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1549</a>                                                                                                                                                                                                                             |
| <b>Syntax</b>                                       | <pre>show multicast flow-map &lt;brief   detail&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                          |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast flow-map &lt;brief   detail&gt;</pre>                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 8.2.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                          |
| <b>Description</b>                                  | Display configuration information about IP multicast flow maps.                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display configuration information about IP multicast flow maps on all systems.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>                        | <a href="#">show multicast flow-map on page 1550</a><br><a href="#">show multicast flow-map detail on page 1550</a>                                                                                                                                                                                                                          |
| <b>Output Fields</b>                                | <p><a href="#">Table 107 on page 1549</a> describes the output fields for the <b>show multicast flow-map</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                            |

**Table 107: show multicast flow-map Output Fields**

| Field Name           | Field Description                                         | Levels of Output |
|----------------------|-----------------------------------------------------------|------------------|
| <b>Name</b>          | Name of the flow map.                                     | All levels       |
| <b>Policy</b>        | Name of the policy associated with the flow map.          | All levels       |
| <b>Cache-timeout</b> | Cache timeout value assigned to the flow map.             | All levels       |
| <b>Bandwidth</b>     | Bandwidth setting associated with the flow map.           | All levels       |
| <b>Adaptive</b>      | Whether or not adaptive mode is enabled for the flow map. | none             |
| <b>Flow-map</b>      | Name of the flow map.                                     | <b>detail</b>    |

Table 107: show multicast flow-map Output Fields (*continued*)

| Field Name                | Field Description                                         | Levels of Output |
|---------------------------|-----------------------------------------------------------|------------------|
| <b>Adaptive Bandwidth</b> | Whether or not adaptive mode is enabled for the flow map. | <b>detail</b>    |
| <b>Redundant Sources</b>  | Redundant sources defined for the same destination group. | <b>detail</b>    |

## Sample Output

### show multicast flow-map

```

user@host> show multicast flow-map
Instance: master
Name Policy Cache timeout Bandwidth Adaptive
map2 policy2 never 2000000 no
map1 policy1 60 seconds 2000000 no

```

## Sample Output

### show multicast flow-map detail

```

user@host> show multicast flow-map detail
Instance: master
Flow-map: map1
 Policy: policy1
 Cache Timeout: 600 seconds
 Bandwidth: 2000000
 Adaptive Bandwidth: yes
 Redundant Sources: 11.11.11.11
 Redundant Sources: 11.11.11.12
 Redundant Sources: 11.11.11.13

```



## show multicast forwarding-cache statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show multicast forwarding-cache statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display IP multicast forwarding cache statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>none</b>—Display multicast forwarding cache statistics for all supported address families for all routing instances.</p> <p><b>inet   inet6</b>—(Optional) Display multicast forwarding cache statistics for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display multicast forwarding cache statistics for a specific routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear multicast forwarding-cache on page 1465</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show multicast forwarding-cache statistics on page 1552</a><br><a href="#">show multicast forwarding-cache statistics instance on page 1552</a>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>            | <a href="#">Table 108 on page 1551</a> describes the output fields for the <b>show multicast forwarding-cache statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                         |

Table 108: show multicast forwarding-cache statistics Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>           | Name of the routing instance for which multicast forwarding cache statistics are displayed.                                                                                                                                                                                                 |
| <b>Family</b>             | Protocol family for which multicast forwarding cache statistics are displayed: <b>ALL</b> , <b>INET</b> , or <b>INET6</b> .                                                                                                                                                                 |
| <b>Suppress Threshold</b> | Maximum number of multicast forwarding cache entries that can be added to the cache. When the number of entries reaches the configured threshold, the device suspends adding new multicast forwarding cache entries.                                                                        |
| <b>Reuse Value</b>        | Number of multicast forwarding cache entries that must be reached before the device creates new multicast forwarding cache entries. When the total number of multicast forwarding cache entries is below the reuse value, the device resumes adding new multicast forwarding cache entries. |

Table 108: show multicast forwarding-cache statistics Output Fields (*continued*)

| Field Name             | Field Description                                                                      |
|------------------------|----------------------------------------------------------------------------------------|
| Warning Threshold      | Threshold at which a warning message is logged (percentage of the suppress threshold). |
| Currently Used Entries | Number of currently used multicast forwarding cache entries.                           |

## Sample Output

### show multicast forwarding-cache statistics

```
user@host> show multicast forwarding-cache statistics
Instance: master Family: INET
Suppress Threshold 100
Reuse Value 80
Warning Threshold 90
Currently Used Entries 101

Instance: master Family: INET6
Suppress Threshold 50
Reuse Value 50
Warning Threshold 80
Currently Used Entries 3
```

### show multicast forwarding-cache statistics instance

```
user@host> show multicast forwarding-cache statistics instance VPN-A
Instance: VPN-A Family: ALL
Suppress Threshold 20
Reuse Value 16
Warning Threshold 50
Currently Used Entries 17
```

## show multicast interface

|                                                     |                                                                                                                                                                                                                                  |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1553</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1553</a>                                                                                                                 |
| <b>Syntax</b>                                       | show multicast interface<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                 |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | show multicast interface                                                                                                                                                                                                         |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 8.3.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                             |
| <b>Description</b>                                  | Display bandwidth information about IP multicast interfaces.                                                                                                                                                                     |
| <b>Options</b>                                      | <b>none</b> —Display all interfaces that have multicast configured.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                        | <a href="#">show multicast interface on page 1554</a>                                                                                                                                                                            |
| <b>Output Fields</b>                                | <a href="#">Table 109 on page 1553</a> describes the output fields for the <b>show multicast interface</b> command. Output fields are listed in the approximate order in which they appear.                                      |

**Table 109: show multicast interface Output Fields**

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interface</b>                        | Name of the multicast interface.                                                                                                                                                                                                                                                                                                                            |
| <b>Maximum bandwidth (bps)</b>          | Maximum bandwidth setting, in bits per second, for this interface.                                                                                                                                                                                                                                                                                          |
| <b>Remaining bandwidth (bps)</b>        | Amount of bandwidth, in bits per second, remaining on the interface.                                                                                                                                                                                                                                                                                        |
| <b>Mapped bandwidth deduction (bps)</b> | Amount of bandwidth, in bits per second, used by any flows that are mapped to the interface.<br><br><b>NOTE:</b> Adding the mapped bandwidth deduction value to the local bandwidth deduction value results in the total deduction value for the interface.<br><br>This field does not appear in the output when the no QoS adjustment feature is disabled. |

Table 109: show multicast interface Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Local bandwidth deduction (bps)</b>       | <p>Amount of bandwidth, in bits per second, used by any mapped flows that are traversing the interface.</p> <p><b>NOTE:</b> Adding the mapped bandwidth deduction value to the local bandwidth deduction value results in the total deduction value for the interface.</p> <p>This field does not appear in the output when the no QoS adjustment feature is disabled.</p> |
| <b>Reverse OIF mapping</b>                   | <p>State of the reverse OIF mapping feature (<b>on</b> or <b>off</b>).</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                                    |
| <b>Reverse OIF mapping no QoS adjustment</b> | <p>State of the no QoS adjustment feature (<b>on</b> or <b>off</b>) for interfaces that are using reverse OIF mapping.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                    |
| <b>Leave timer</b>                           | <p>Amount of time a mapped interface remains active after the last mapping ends.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                          |
| <b>No QoS adjustment</b>                     | <p>State (<b>on</b>) of the no QoS adjustment feature when this feature is enabled.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                       |

## Sample Output

### show multicast interface

```

user@host> show multicast interface
Interface Maximum bandwidth (bps) Remaining bandwidth (bps)
fe-0/0/3 10000000 0
fe-0/0/3.210 10000000 -2000000
fe-0/0/3.220 100000000 100000000
fe-0/0/3.230 20000000 18000000
fe-0/0/2.200 100000000 100000000

```

## show multicast minfo

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show multicast minfo</code><br><code>&lt;host&gt;</code>                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                  |
| <b>Description</b>              | Display configuration information about IP multicast networks, including neighboring multicast router addresses.                                                                                                          |
| <b>Options</b>                  | <b>none</b> —Display configuration information about all multicast networks.<br><br><b>host</b> —(Optional) Display configuration information about a particular host. Replace <i>host</i> with a hostname or IP address. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show multicast minfo on page 1556</a>                                                                                                                                                                         |
| <b>Output Fields</b>            | <a href="#">Table 110 on page 1555</a> describes the output fields for the <b>show multicast minfo</b> command. Output fields are listed in the approximate order in which they appear.                                   |

Table 110: show multicast minfo Output Fields

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>source-address</i>                | Query address, hostname (DNS name or IP address of the source address), and multicast protocol version or the software version of another vendor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>ip-address-1—&gt;ip-address-2</i> | Queried router interface address and directly attached neighbor interface address, respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>(name or ip-address)</i>          | Name or IP address of neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>[metric/threshold/type/flags]</i> | Neighbor's multicast profile: <ul style="list-style-type: none"> <li><b>metric</b>—Always has a value of 1, because <b>minfo</b> queries the directly connected interfaces of a device.</li> <li><b>threshold</b>—Multicast threshold time-to-live (TTL). The range of values is 0 through 255.</li> <li><b>type</b>—Multicast connection type: <b>pim</b> or <b>tunnel</b>.</li> <li><b>flags</b>—Flags for this route: <ul style="list-style-type: none"> <li><b>querier</b>—Queried router is the designated router for the neighboring session.</li> <li><b>leaf</b>—Link is a leaf in the multicast network.</li> <li><b>down</b>—Link status indicator.</li> </ul> </li> </ul> |

## Sample Output

show multicast mrinfo

```
user@host> show multicast mrinfo 10.35.4.1
10.35.4.1 (10.35.4.1) [version 12.0]:
 192.168.195.166 -> 0.0.0.0 (local) [1/0/pim/querier/leaf]
 10.38.20.1 -> 0.0.0.0 (local) [1/0/pim/querier/leaf]
 10.47.1.1 -> 10.47.1.2 (10.47.1.2) [1/5/pim]
 0.0.0.0 -> 0.0.0.0 (local) [1/0/pim/down]
```

## show multicast next-hops

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1557</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1557</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                       | <pre>show multicast next-hops &lt;brief   detail&gt; &lt;identifier-number&gt; &lt;inet   inet6&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast next-hops &lt;brief   detail&gt; &lt;identifier-number&gt; &lt;inet   inet6&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p><b>detail</b> option display of next-hop ID number introduced in Junos OS Release 11.1 for M Series and T Series routers and EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>                                  | Display the entries in the IP multicast next-hop table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about all entries in the multicast next-hop table for all supported address families.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p>When you include the <b>detail</b> option on M Series and T Series routers and EX Series switches, the downstream interface name includes the next-hop ID number in parentheses, in the form <b>fe-0/1/2.0-(1048574)</b> where <b>1048574</b> is the next-hop ID number.</p> <p><b>identifier-number</b>—(Optional) Show a particular next hop by ID number. The range of values is 1 through 65,535.</p> <p><b>inet   inet6</b>—(Optional) Display entries for IPv4 or IPv6 family addresses, respectively.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>                        | <a href="#">show multicast next-hops on page 1558</a><br><a href="#">show multicast next-hops (Bidirectional PIM on page 1558</a><br><a href="#">show multicast next-hops brief on page 1559</a><br><a href="#">show multicast next-hops detail on page 1559</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Output Fields** Table 111 on page 1558 describes the output fields for the **show multicast next-hops** command. Output fields are listed in the approximate order in which they appear.

**Table 111: show multicast next-hops Output Fields**

| Field Name                     | Field Description                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Family</b>                  | Protocol family (such as <b>INET</b> ).                                                                                                                |
| <b>ID</b>                      | Next-hop identifier of the prefix. The identifier is returned by the routing device's Packet Forwarding Engine.                                        |
| <b>Refcount</b>                | Number of cache entries that are using this next hop.                                                                                                  |
| <b>KRefcount</b>               | Kernel reference count for the next hop.                                                                                                               |
| <b>Downstream interface</b>    | Interface names associated with each multicast next-hop ID.                                                                                            |
| <b>Incoming interface list</b> | List of interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM. |

## Sample Output

### show multicast next-hops

```
user@host> show multicast next-hops
Family: INET
ID Refcount KRefcount Downstream interface
262142 4 2 so-1/0/0.0
262143 2 1 mt-1/1/0.49152
262148 2 1 mt-1/1/0.32769
```

### show multicast next-hops (Bidirectional PIM)

```
user@host> show multicast next-hops
Family: INET
ID Refcount KRefcount Downstream interface
2097151 8 4 ge-0/0/1.0

Family: INET6
ID Refcount KRefcount Downstream interface
2097157 2 1 ge-0/0/1.0

Family: Incoming interface list
ID Refcount KRefcount Downstream interface
513 5 2 lo0.0
 ge-0/0/1.0
514 5 2 lo0.0
 ge-0/0/1.0
 xe-4/1/0.0
515 3 1 lo0.0
 ge-0/0/1.0
 xe-4/1/0.0
544 1 0 lo0.0
 xe-4/1/0.0
```



### show multicast next-hops brief

The output for the **show multicast next-hops brief** command is identical to that for the **show multicast next-hops** command. For sample output, see [show multicast next-hops on page 1558](#).

### show multicast next-hops detail

```
user@host> show multicast next-hops detail
Family: INET
ID Refcount KRefCount Downstream interface
1048577 2 1 fe-0/1/2.0-(1048574)
 ge-0/2/3.0-(1048576)
```

## show multicast pim-to-igmp-proxy

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1560</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1560</a>                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                       | <pre>show multicast pim-to-igmp-proxy &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast pim-to-igmp-proxy &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 9.6 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                    |
| <b>Description</b>                                  | Display configuration information about PIM-to-IGMP message translation, also known as PIM-to-IGMP proxy.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display configuration information about PIM-to-IGMP message translation for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display configuration information about PIM-to-IGMP message translation for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>                        | <a href="#">show multicast pim-to-igmp-proxy on page 1561</a><br><a href="#">show multicast pim-to-igmp-proxy instance on page 1561</a>                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>                                | <a href="#">Table 112 on page 1560</a> describes the output fields for the <b>show multicast pim-to-igmp-proxy</b> command. Output fields are listed in the order in which they appear.                                                                                                                                                                                                                                                             |

**Table 112: show multicast pim-to-igmp-proxy Output Fields**

| Field Name                   | Field Description                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>              | Routing instance. Default instance is <b>master</b> (inet.0 routing table).                                                                           |
| <b>Proxy state</b>           | State of PIM-to-IGMP message translation, also known as PIM-to-IGMP proxy, on the configured upstream interfaces: <b>enabled</b> or <b>disabled</b> . |
| <b><i>interface-name</i></b> | Name of upstream interface (no more than two allowed) on which PIM-to-IGMP message translation is configured.                                         |

## Sample Output

### show multicast pim-to-igmp-proxy

```
user@host> show multicast pim-to-igmp-proxy
Instance: master Proxy state: enabled
ge-0/1/0.1
ge-0/1/0.2
```

### show multicast pim-to-igmp-proxy instance

```
user@host> show multicast pim-to-igmp-proxy instance VPN-A
Instance: VPN-A Proxy state: enabled
ge-0/1/0.1
```

## show multicast pim-to-mld-proxy

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1562</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1562</a>                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax</b>                                       | <pre>show multicast pim-to-mld-proxy &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast pim-to-mld-proxy &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 9.6 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.3.</p> <p><b>instance</b> option introduced in Junos OS Release 10.3 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>    |
| <b>Description</b>                                  | Display configuration information about PIM-to-MLD message translation, also known as PIM-to-MLD proxy.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display configuration information about PIM-to-MLD message translation for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display configuration information about PIM-to-MLD message translation for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                        | <a href="#">show multicast pim-to-mld-proxy on page 1563</a><br><a href="#">show multicast pim-to-mld-proxy instance on page 1563</a>                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>                                | <a href="#">Table 113 on page 1562</a> describes the output fields for the <b>show multicast pim-to-mld-proxy</b> command. Output fields are listed in the order in which they appear.                                                                                                                                                                                                                                                            |

**Table 113: show multicast pim-to-mld-proxy Output Fields**

| Field Name                   | Field Description                                                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proxy state</b>           | State of PIM-to-MLD message translation, also known as PIM-to-MLD proxy, on the configured upstream interfaces: <b>enabled</b> or <b>disabled</b> . |
| <b><i>interface-name</i></b> | Name of upstream interface (no more than two allowed) on which PIM-to-MLD message translation is configured.                                        |

## Sample Output

### show multicast pim-to-mld-proxy

```
user@host> show multicast pim-to-mld-proxy
Instance: master Proxy state: enabled
ge-0/5/0.1
ge-0/5/0.2
```

### show multicast pim-to-mld-proxy instance

```
user@host> show multicast pim-to-mld-proxy instance VPN-A
Instance: VPN-A Proxy state: enabled
ge-0/5/0.1
```

show multicast route

- |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                               | <a href="#">Syntax on page 1564</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1564</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Syntax                                       | <pre>show multicast route &lt;brief   detail   extensive   summary&gt; &lt;active   all   inactive&gt; &lt;group group&gt; &lt;inet   inet6&gt; &lt;instance instance name&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;regular-expression&gt; &lt;source-prefix source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Syntax (EX Series Switch and the QFX Series) | <pre>show multicast route &lt;brief   detail   extensive   summary&gt; &lt;active   all   inactive&gt; &lt;group group&gt; &lt;inet   inet6&gt; &lt;instance instance name&gt; &lt;regular-expression&gt; &lt;source-prefix source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Release Information                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>inet6 and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description                                  | <p>Display the entries in the IP multicast forwarding table. You can display similar information with the <b>show route table inet.1</b> command.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Options                                      | <p><b>none</b>—Display standard information about all entries in the multicast forwarding table for all routing instances.</p> <p><b>brief   detail   extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>active   all   inactive</b>—(Optional) Display all active entries, all entries, or all inactive entries, respectively, in the multicast forwarding table.</p> <p><b>group group</b>—(Optional) Display the cache entries for a particular group.</p> <p><b>inet   inet6</b>—(Optional) Display multicast forwarding table entries for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance instance-name</b>—(Optional) Display entries in the multicast forwarding table for a specific multicast instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |

**regular-expression**—(Optional) Display information about the multicast forwarding table entries that match a UNIX OS-style regular expression.

**source-prefix source-prefix**—(Optional) Display the cache entries for a particular source prefix.

**Required Privilege Level** view

**Related Documentation** • [Example: Configuring Bidirectional PIM](#)

**List of Sample Output** [show multicast route on page 1566](#)  
[show multicast route \(Bidirectional PIM\) on page 1567](#)  
[show multicast route brief on page 1567](#)  
[show multicast route detail on page 1568](#)  
[show multicast route extensive \(Bidirectional PIM\) on page 1568](#)  
[show multicast route instance <instance-name> extensive on page 1569](#)  
[show multicast route summary on page 1569](#)

**Output Fields** [Table 114 on page 1565](#) describes the output fields for the **show multicast route** command. Output fields are listed in the approximate order in which they appear.

**Table 114: show multicast route Output Fields**

| Field Name                    | Field Description                                                                                                                                                                               | Level of Output         |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| family                        | IPv4 address family ( <b>INET</b> ) or IPv6 address family ( <b>INET6</b> ).                                                                                                                    | All levels              |
| Group                         | Group address.<br><br>For any-source multicast routes, for example for bidirectional PIM, the group address includes the prefix length.                                                         | All levels              |
| Source                        | Prefix and length of the source as it is in the multicast forwarding table.                                                                                                                     | All levels              |
| Incoming interface list       | List of interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM.                                          | All levels              |
| Upstream interface            | Name of the interface on which the packet with this source prefix is expected to arrive.                                                                                                        | All levels              |
| Upstream rpf interface list   | When multicast-only fast reroute (MoFRR) is enabled, a PIM router propagates join messages on two upstream RPF interfaces to receive multicast traffic on both links for the same join request. | All levels              |
| Downstream interface list     | List of interface names to which the packet with this source prefix is forwarded.                                                                                                               | All levels              |
| Number of outgoing interfaces | Total number of outgoing interfaces for each (S,G) entry.                                                                                                                                       | <b>extensive</b>        |
| Session description           | Name of the multicast session.                                                                                                                                                                  | <b>detail extensive</b> |

Table 114: show multicast route Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output   |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Statistics                             | Rate at which packets are being forwarded for this source and group entry (in Kbps and pps), and number of packets that have been forwarded to this prefix. If one or more of the kilobits per second packet forwarding statistic queries fails or times out, the statistics field displays <b>Forwarding statistics are not available</b> .<br><br><b>NOTE:</b> On QFX Series switches and OCX Series switches, this field does not report valid statistics. | detail extensive  |
| Next-hop ID                            | Next-hop identifier of the prefix. The identifier is returned by the routing device's Packet Forwarding Engine and is also displayed in the output of the <b>show multicast nexthops</b> command.                                                                                                                                                                                                                                                             | detail extensive  |
| Incoming interface list ID             | For bidirectional PIM, incoming interface list identifier.<br><br>Identifiers for interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM.                                                                                                                                                                                                                              | detail extensive  |
| Upstream protocol                      | The protocol that maintains the active multicast forwarding route for this group or source.<br><br>When the <b>show multicast route extensive</b> command is used with the <b>display-origin-protocol</b> option, the field name is only <b>Protocol</b> and not <b>Upstream Protocol</b> . However, this field also displays the protocol that installed the active route.                                                                                   | detail extensive  |
| Route type                             | Type of multicast route. Values can be (S,G) or (*G).                                                                                                                                                                                                                                                                                                                                                                                                         | summary           |
| Route state                            | Whether the group is <b>Active</b> or <b>Inactive</b> .                                                                                                                                                                                                                                                                                                                                                                                                       | summary extensive |
| Route count                            | Number of multicast routes.                                                                                                                                                                                                                                                                                                                                                                                                                                   | summary           |
| Forwarding state                       | Whether the prefix is pruned or forwarding.                                                                                                                                                                                                                                                                                                                                                                                                                   | extensive         |
| Cache lifetime/timeout                 | Number of seconds until the prefix is removed from the multicast forwarding table. A value of <b>never</b> indicates a permanent forwarding entry. A value of <b>forever</b> indicates routes that do not have keepalive times.                                                                                                                                                                                                                               | extensive         |
| Wrong incoming interface notifications | Number of times that the upstream interface was not available.                                                                                                                                                                                                                                                                                                                                                                                                | extensive         |
| Uptime                                 | Time since the creation of a multicast route.                                                                                                                                                                                                                                                                                                                                                                                                                 | extensive         |

## Sample Output

### show multicast route

```

user@host> show multicast route
Family: INET

Group: 228.0.0.0

```



```

Source: 10.255.14.144/32
Upstream interface: local
Downstream interface list:
 so-1/0/0.0

Group: 239.1.1.1
Source: 10.255.14.144/32
Upstream interface: local
Downstream interface list:
 so-1/0/0.0

Group: 239.1.1.1
Source: 10.255.70.15/32
Upstream interface: so-1/0/0.0
Downstream interface list:
 mt-1/1/0.1081344

Family: INET6

```

### show multicast route (Bidirectional PIM)

```

user@host> show multicast route
Family: INET

Group: 224.1.1.0/24
Source: *
Incoming interface list:
 lo0.0 ge-0/0/1.0
Downstream interface list:
 ge-0/0/1.0

Group: 224.1.3.0/24
Source: *
Incoming interface list:
 lo0.0 ge-0/0/1.0 xe-4/1/0.0
Downstream interface list:
 ge-0/0/1.0

Group: 225.1.1.0/24
Source: *
Incoming interface list:
 lo0.0 ge-0/0/1.0
Downstream interface list:
 ge-0/0/1.0

Group: 225.1.3.0/24
Source: *
Incoming interface list:
 lo0.0 ge-0/0/1.0 xe-4/1/0.0
Downstream interface list:
 ge-0/0/1.0

Family: INET6

```

### show multicast route brief

The output for the **show multicast route brief** command is identical to that for the **show multicast route** command. For sample output, see [show multicast route on page 1566](#) or [show multicast route \(Bidirectional PIM\) on page 1567](#).

### show multicast route detail

```
user@host> show multicast route detail
Family: INET

Group: 228.0.0.0
 Source: 10.255.14.144/32
 Upstream interface: local
 Downstream interface list:
 so-1/0/0.0
 Session description: Unknown
 Statistics: 8 kbps, 100 pps, 45272 packets
 Next-hop ID: 262142
 Upstream protocol: PIM

Group: 239.1.1.1
 Source: 10.255.14.144/32
 Upstream interface: local
 Downstream interface list:
 so-1/0/0.0
 Session description: Administratively Scoped
 Statistics: 0 kbps, 0 pps, 13404 packets
 Next-hop ID: 262142
 Upstream protocol: PIM

Group: 239.1.1.1
 Source: 10.255.70.15/32
 Upstream interface: so-1/0/0.0
 Downstream interface list:
 mt-1/1/0.1081344
 Session description: Administratively Scoped
 Statistics: 46 kbps, 1000 pps, 921077 packets

 Next-hop ID: 262143
 Upstream protocol: PIM

Family: INET6
```

### show multicast route extensive (Bidirectional PIM)

```
user@host> show multicast route extensive
Family: INET

Group: 224.1.1.0/24
 Source: *
 Incoming interface list:
 lo0.0 ge-0/0/1.0
 Downstream interface list:
 ge-0/0/1.0
 Number of outgoing interfaces: 1
 Session description: NOB Cross media facilities
 Statistics: 0 kbps, 0 pps, 0 packets
 Next-hop ID: 2097153
 Incoming interface list ID: 585
 Upstream protocol: PIM
 Route state: Active
 Forwarding state: Forwarding
 Cache lifetime/timeout: forever
 Wrong incoming interface notifications: 0

Group: 224.1.3.0/24
```

```

Source: *
Incoming interface list:
 lo0.0 ge-0/0/1.0 xe-4/1/0.0
Downstream interface list:
 ge-0/0/1.0
Number of outgoing interfaces: 1
Session description: NOB Cross media facilities
Statistics: 0 kbps, 0 pps, 0 packets
Next-hop ID: 2097153
Incoming interface list ID: 589
Upstream protocol: PIM
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: forever
Wrong incoming interface notifications: 0

```

Family: INET6

#### show multicast route instance <instance-name> extensive

```

user@host> show multicast route instance mvpn extensive
Family: INET

```

```

Group: 239.10.10.10
Source: 2.0.0.2/32
Upstream interface: xe-0/0/0.102
Downstream interface list:
 xe-10/3/0.0 xe-0/3/0.0 xe-0/0/0.106 xe-0/0/0.105
 xe-0/0/0.103 xe-0/0/0.104 xe-0/0/0.107 xe-0/0/0.108
Session description: Administratively Scoped
Statistics: 256 kbps, 3998 pps, 670150 packets
Next-hop ID: 1048579
Upstream protocol: MVPN
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: forever
Wrong incoming interface notifications: 58
Uptime: 00:00:04

```

#### show multicast route summary

```

user@host> show multicast route summary
Instance: master Family: INET

```

| Route type | Route state | Route count |
|------------|-------------|-------------|
| (S,G)      | Active      | 2           |
| (S,G)      | Inactive    | 3           |

Instance: master Family: INET6

## show multicast rpf

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1570</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1570</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                       | <pre>show multicast rpf &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;prefix&gt; &lt;summary&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast rpf &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;prefix&gt; &lt;summary&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                                  | Display information about multicast reverse-path-forwarding (RPF) calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display RPF calculation information for all supported address families.</p> <p><b>inet   inet6</b>—(Optional) Display the RPF calculation information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about multicast RPF calculations for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>prefix</b>—(Optional) Display the RPF calculation information for the specified prefix.</p> <p><b>summary</b>—(Optional) Display a summary of all multicast RPF information.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>                        | <a href="#">show multicast rpf on page 1571</a><br><a href="#">show multicast rpf inet6 on page 1572</a><br><a href="#">show multicast rpf prefix on page 1573</a><br><a href="#">show multicast rpf summary on page 1573</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Output Fields** Table 115 on page 1571 describes the output fields for the **show multicast rpf** command. Output fields are listed in the approximate order in which they appear.

**Table 115: show multicast rpf Output Fields**

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>      | Name of the routing instance. (Displayed when multicast is configured within a routing instance.)                                                                                                                                                                                                                                                                                                             |
| <b>Source prefix</b> | Prefix and length of the source as it exists in the multicast forwarding table.                                                                                                                                                                                                                                                                                                                               |
| <b>Protocol</b>      | How the route was learned.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Interface</b>     | Upstream RPF interface.<br><br><b>NOTE:</b> The displayed interface information does not apply to bidirectional PIM RP addresses. This is because the <b>show multicast rpf</b> command does not take into account equal-cost paths or the designated forwarder. For accurate upstream RPF interface information, always use the <b>show pim join extensive</b> command when bidirectional PIM is configured. |
| <b>Neighbor</b>      | Upstream RPF neighbor.<br><br><b>NOTE:</b> The displayed neighbor information does not apply to bidirectional PIM. This is because the <b>show multicast rpf</b> command does not take into account equal-cost paths or the designated forwarder. For accurate upstream RPF neighbor information, always use the <b>show pim join extensive</b> command when bidirectional PIM is configured.                 |

## Sample Output

### show multicast rpf

```

user@host> show multicast rpf

Multicast RPF table: inet.0, 12 entries

0.0.0.0/0
 Protocol: Static

10.255.14.132/32
 Protocol: Direct
 Interface: lo0.0

10.255.245.91/32
 Protocol: IS-IS
 Interface: so-1/1/1.0
 Neighbor: 192.168.195.21

127.0.0.1/32
Inactive172.16.0.0/12
Protocol: Static
Interface: fxp0.0

```

Neighbor: 192.168.14.254

192.168.0.0/16  
Protocol: Static  
Interface: fxp0.0  
Neighbor: 192.168.14.254

192.168.14.0/24  
Protocol: Direct  
Interface: fxp0.0

192.168.14.132/32  
Protocol: Local

192.168.195.20/30  
Protocol: Direct  
Interface: so-1/1/1.0

192.168.195.22/32  
Protocol: Local

192.168.195.36/30  
Protocol: IS-IS  
Interface: so-1/1/1.0  
Neighbor: 192.168.195.21

### show multicast rpf inet6

```
user@host> show multicast rpf inet6
```

Multicast RPF table: inet6.0, 12 entries

::10.255.14.132/128  
Protocol: Direct  
Interface: lo0.0

::10.255.245.91/128  
Protocol: IS-IS  
Interface: so-1/1/1.0  
Neighbor: fe80::2a0:a5ff:fe28:2e8c

::192.168.195.20/126  
Protocol: Direct  
Interface: so-1/1/1.0

::192.168.195.22/128  
Protocol: Local

::192.168.195.36/126  
Protocol: IS-IS  
Interface: so-1/1/1.0  
Neighbor: fe80::2a0:a5ff:fe28:2e8c

::192.168.195.76/126  
Protocol: Direct  
Interface: fe-2/2/0.0

::192.168.195.77/128  
Protocol: Local

```
fe80::/64
Protocol: Direct
Interface: so-1/1/1.0

fe80::290:69ff:fe0c:993a/128
Protocol: Local

fe80::2a0:a5ff:fe12:84f/128
Protocol: Direct
Interface: lo0.0

ff02::2/128
Protocol: PIM

ff02::d/128
Protocol: PIM
```

#### show multicast rpf prefix

```
user@host> show multicast rpf ff02::/16

Multicast RPF table: inet6.0, 13 entries

ff02::2/128
 Protocol: PIM

ff02::d/128
 Protocol: PIM

...
```

#### show multicast rpf summary

```
user@host> show multicast rpf summary

Multicast RPF table: inet.0, 16 entries
Multicast RPF table: inet6.0, 12 entries
```

## show multicast scope

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1574</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1574</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                                       | <pre>show multicast scope &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast scope &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                            |
| <b>Description</b>                                  | Display administratively scoped IP multicast information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about administratively scoped multicast information for all supported address families in all routing instances.</p> <p><b>inet   inet6</b>—(Optional) Display scoped multicast information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display administratively scoped information for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show multicast scope on page 1575</a><br><a href="#">show multicast scope inet on page 1575</a><br><a href="#">show multicast scope inet6 on page 1575</a>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>                                | <p><a href="#">Table 116 on page 1574</a> describes the output fields for the <b>show multicast scope</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 116: show multicast scope Output Fields**

| Field Name   | Field Description                                           |
|--------------|-------------------------------------------------------------|
| Scope name   | Name of the multicast scope.                                |
| Group Prefix | Range of multicast groups that are scoped.                  |
| Interface    | Interface that is the boundary of the administrative scope. |



Table 116: show multicast scope Output Fields (*continued*)

| Field Name      | Field Description                 |
|-----------------|-----------------------------------|
| Resolve Rejects | Number of kernel resolve rejects. |

## Sample Output

### show multicast scope

```
user@host> show multicast scope
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| 232-net    | 232.232.0.0/16 | fe-0/0/0.1 | 0               |
| local      | 239.255.0.0/16 | fe-0/0/0.1 | 0               |
| local      | ff05::/16      | fe-0/0/0.1 | 0               |
| larry      | ff05::1234/128 | fe-0/0/0.1 | 0               |

### show multicast scope inet

```
user@host> show multicast scope inet
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| 232-net    | 232.232.0.0/16 | fe-0/0/0.1 | 0               |
| local      | 239.255.0.0/16 | fe-0/0/0.1 | 0               |

### show multicast scope inet6

```
user@host> show multicast scope inet6
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| local      | ff05::/16      | fe-0/0/0.1 | 0               |
| larry      | ff05::1234/128 | fe-0/0/0.1 | 0               |

## show multicast snooping next-hops

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show multicast snooping next-hops<br><brief   detail><br><identifier <i>next-hop-ID</i> ><br><inet><br><inet6><br><logical-system <i>logical-system-name</i> >                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Display information about the IP multicast snooping next-hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet</b>—(Optional) Display information for IPv4 multicast next hops only. If a family is not specified, both IPv4 and IPv6 results will be shown.</p> <p><b>inet6</b>—(Optional) Display information for IPv6 multicast next hops only. If a family is not specified, both IPv4 and IPv6 results will be shown.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>    | <a href="#">show multicast snooping next-hops on page 1577</a><br><a href="#">show multicast snooping next-hops (IGMP snooping enabled on a VPLS) on page 1577</a>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | <a href="#">Table 117 on page 1576</a> describes the output fields for the <b>show multicast snooping next-hops</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                               |

**Table 117: show multicast snooping next-hops Output Fields**

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Family</b>               | Protocol family for which multicast snooping next hops are displayed: <b>INET</b> or <b>INET6</b> .                                                                                                                                                                                                                                                                                                 |
| <b>RefCount</b>             | Number of cache entries that are using this next hop.                                                                                                                                                                                                                                                                                                                                               |
| <b>KRefCount</b>            | Kernel reference count for the next hop.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Downstream interface</b> | Interface names associated with each multicast next-hop ID.                                                                                                                                                                                                                                                                                                                                         |
| <b>Nexthop Id</b>           | Identifier for the next-hop.<br><br><b>NOTE:</b> To see the next-hop ID for a given PE mesh group, <b>igmp-snooping</b> must be enabled for the relevant VPLS routing instance. (Junos OS creates a default CE and VE mesh groups for each VPLS routing instance. The next hop of the VE mesh group is the set of VE mesh-group interfaces of the remaining PEs in the same VPLS routing instance.) |

## Sample Output

### show multicast snooping next-hops

```

user@host> show multicast snooping next-hops
Family: INET
ID Refcount KRefCount Downstream interface Nexthop Id
1048574 4 1 ge-0/1/0.1000
 ge-0/1/2.1000
 ge-0/1/3.1000

1048574 4 1 ge-0/1/0.1000-(2000)
 1048575
 1048576

1048575 2 0 ge-0/1/2.1000-(2001)
 ge-0/1/3.1000-(2002)

1048576 2 0 lsi.1048578-(2003)
 lsi.1048579-(2004)

```

### show multicast snooping next-hops (IGMP snooping enabled on a VPLS)

In this example, ID 1048585 is the VE next-hop ID created for the VE next hop that is holding VE interfaces for the routing instance. It only appears if igmp snooping is enabled on the VPLS.

```

user@host> show multicast snooping next-hops
Family: INET
ID Refcount KRefCount Downstream interface Addr
1048588 2 1 1048585
1048589 2 1 1048585
 ge-0/0/5.100
0 2 0 ge-0/0/0.100
 ge-0/0/1.100

1048583 2 1 local
1048587 2 1 local
 1048585
1048586 4 2 local
 1048585
 ge-0/0/5.100
1048584 2 1 local
 ge-0/0/5.100
1048582 6 2 ge-0/0/5.100
0 2 0 ge-0/0/0.200
 ge-0/0/2.200
0 2 0 ge-0/0/0.300
 ge-0/0/2.300
0 1 0 vt-0/0/10.17825792
 vt-0/0/10.17825793
0 1 0 vt-0/0/10.1048576
 vt-0/0/10.1048578
1048585 5 0 vt-0/0/10.1048577
 vt-0/0/10.1048579
0 1 0 vt-0/0/10.34603008
 vt-0/0/10.34603009

```

## show multicast sessions

---

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                               | <a href="#">Syntax on page 1578</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1578</a>                                                                                                                                                                                                                                                                                                                                                                                        |
| Syntax                                       | <code>show multicast sessions</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;regular-expression&gt;</code>                                                                                                                                                                                                                                                                                            |
| Syntax (EX Series Switch and the QFX Series) | <code>show multicast sessions</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;regular-expression&gt;</code>                                                                                                                                                                                                                                                                                                                                                                      |
| Release Information                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                |
| Description                                  | Display information about announced IP multicast sessions.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Options                                      | <b>none</b> —Display standard information about all multicast sessions for all routing instances.<br><br><b>brief   detail   extensive</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>regular-expression</i></b> —(Optional) Display information about announced sessions that match a UNIX-style regular expression. |
| Required Privilege Level                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| List of Sample Output                        | <a href="#">show multicast sessions on page 1579</a><br><a href="#">show multicast sessions regular-expression detail on page 1579</a>                                                                                                                                                                                                                                                                                                                                                                  |
| Output Fields                                | <a href="#">Table 118 on page 1578</a> describes the output fields for the <b>show multicast sessions</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                              |

**Table 118: show multicast sessions Output Fields**

| Field Name          | Field Description                               |
|---------------------|-------------------------------------------------|
| <i>session-name</i> | Name of the known announced multicast sessions. |

---

## Sample Output

### show multicast sessions

```

user@host> show multicast sessions
1-Department of Biological Sciences, LSU
...
Monterey Bay - DockCam
Monterey Bay - JettyCam
Monterey Bay - StandCam
Monterey DockCam
Monterey DockCam / ROV cam
...
NASA TV (MPEG-1)
...
UO Broadcast - NASA Videos - 25 Years of Progress
UO Broadcast - NASA Videos - Journey through the Solar System
UO Broadcast - NASA Videos - Life in the Universe
UO Broadcast - NASA Videos - Nasa and the Airplane
UO Broadcasts OPB's Oregon Story
UO DOD News Clips
UO Medical Management of Biological Casualties (1)
UO Medical Management of Biological Casualties (2)
UO Medical Management of Biological Casualties (3)
...
376 active sessions.

```

### show multicast sessions regular-expression detail

```

user@host> show multicast sessions "NASA TV" detail
SDP Version: 0 Originated by: -@128.223.83.33
Session: NASA TV (MPEG-1)
Description: NASA television in MPEG-1 format, provided by Private University.
Please contact the UO if you have problems with this feed.
Email: Your Name Here <multicast@lists.private.edu>
Phone: Your Name Here <888/555-1212>
Bandwidth: AS:1000
Start time: permanent
Stop time: none
Attribute: type:broadcast
Attribute: tool:IP/TV Content Manager 3.4.14
Attribute: live:capture:1
Attribute: x-iptv-capture:mp1s
Media: video 54302 RTP/AVP 32 31 96 97
Connection Data: 224.2.231.45 ttl 127
Attribute: quality:8
Attribute: framerate:30
Attribute: rtpmap:96 WBIH/90000
Attribute: rtpmap:97 MP4V-ES/90000
Attribute: x-iptv-svr:video 128.223.91.191 live
Attribute: fmtp:32 type=mpeg1
Media: audio 28848 RTP/AVP 14 0 96 3 5 97 98 99 100 101 102 10 11 103 104 105 106
Connection Data: 224.2.145.37 ttl 127
Attribute: rtpmap:96 X-WAVE/8000
Attribute: rtpmap:97 L8/8000/2
Attribute: rtpmap:98 L8/8000
Attribute: rtpmap:99 L8/22050/2
Attribute: rtpmap:100 L8/22050
Attribute: rtpmap:101 L8/11025/2
Attribute: rtpmap:102 L8/11025
Attribute: rtpmap:103 L16/22050/2

```

Attribute: rtpmap:104 L16/22050

1 matching sessions.

## show multicast snooping route

**Syntax** show multicast snooping route  
 <regexp>  
 <active>  
 <all>  
 <bridge-domain *bridge-domain-name*>  
 <brief >  
 <control>  
 <data>  
 <detail >  
 <extensive>  
 <group *group*>  
 <inactive>  
 <inet>  
 <inet6>  
 <instance *instance-name*>  
 <logical-system *logical-system-name*>  
 <mesh-group *mesh-group-name*>  
 <qualified-vlan *vlan-id*>  
 <source-prefix *source-prefix*>  
 <vlan *vlan-id*>

**Release Information** Command introduced in Junos OS Release 8.5.  
 Support for **control**, **data**, **qualified-vlan** and **vlan** options introduced in Junos OS Release 13.3 for EX Series switches.

**Description** Display the entries in the IP multicast snooping forwarding table. You can display some of this information with the **show route table inet.1** command.

**Options** **none**—Display standard information about all entries in the multicast snooping table for all virtual switches and all bridge domains.

**active | all | inactive** —(Optional) Display all active entries, all entries, or all inactive entries, respectively, in the multicast snooping table.

**bridge-domain *bridge-domain***—(Optional) Display the entries for a particular bridge domain.

**brief | detail | extensive**—(Optional) Display the specified level of output.

**control**—(Optional) Display control route entries.

**data**—(Optional) Display data route entries.

**group *group***—(Optional) Display the entries for a particular group.

**inet**—(Optional) Display IPv4 information.

**inet6**—(Optional) Display IPv6 information.

**instance *instance-name***—(Optional) Display the entries for a multicast instance.

**logical-system** *logical-system-name*—(Optional) Display information about a particular logical system, or type 'all'.

**mesh-group** *mesh-group-name*—(Optional) Display the entries for a particular mesh group.

**qualified-vlan** *vlan-id*—(Optional) Display the entries for a particular qualified VLAN.

**regex**—(Optional) Display information about the multicast forwarding table entries that match a UNIX-style regular expression.

**source-prefix** *source-prefix*—(Optional) Display the entries for a particular source prefix.

**vlan** *vlan-id*—(Optional) Display the entries for a particular VLAN.

**Required Privilege Level** view

**List of Sample Output** [show multicast snooping route bridge-domain on page 1583](#)  
[show multicast snooping route instance vs on page 1583](#)  
[show multicast snooping route extensive on page 1583](#)

**Output Fields** [Table 119 on page 1582](#) describes the output fields for the **show multicast snooping route** command. Output fields are listed in the approximate order in which they appear.

**Table 119: show multicast snooping route Output Fields**

| Field Name              | Field Description                                                                                                                                                                         | Level of Output         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Next-hop Bulking</b> | Displays whether next-hop bulk updating is <b>ON</b> or <b>OFF</b> (only for routing-instance type of <b>virtual switch</b> or <b>vpls</b> ).                                             | All levels              |
| <b>Family</b>           | IPv4 address family ( <b>INET</b> ) or IPv6 address family ( <b>INET6</b> ).                                                                                                              | All levels              |
| <b>Group</b>            | Group address.                                                                                                                                                                            | All levels              |
| <b>Source</b>           | Prefix and length of the source as it is in the multicast forwarding table. For (*G) entries, this field is set to "*".                                                                   | All levels              |
| <b>Routing-instance</b> | Name of the routing instance to which this routing information applies. (Displayed when multicast is configured within a routing instance.)                                               | All levels              |
| <b>Learning Domain</b>  | Name of the learning domain to which this routing information applies.                                                                                                                    | <b>detail extensive</b> |
| <b>Statistics</b>       | Rate at which packets are being forwarded for this source and group entry (in Kbps and pps), and number of packets that have been forwarded to this prefix.                               | <b>detail extensive</b> |
| <b>Next-hop ID</b>      | Next-hop identifier of the prefix. The identifier is returned by the router's Packet Forwarding Engine and is also displayed in the output of the <b>show multicast nexthops</b> command. | <b>detail extensive</b> |
| <b>Route state</b>      | Whether the group is <b>Active</b> or <b>Inactive</b> .                                                                                                                                   | <b>extensive</b>        |
| <b>Forwarding state</b> | Whether the prefix is <b>Pruned</b> or <b>Forwarding</b> .                                                                                                                                | <b>extensive</b>        |



Table 119: show multicast snooping route Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                  | Level of Output  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Cache lifetime/timeout | Number of seconds until the prefix is removed from the multicast forwarding table. A value of <b>never</b> indicates a permanent forwarding entry. | <b>extensive</b> |

## Sample Output

### show multicast snooping route bridge-domain

```

user@host> show multicast snooping route bridge-domain br-dom-1 extensive
Family: INET

Group: 232.1.1.1
Source: 192.168.3.100/32
Downstream interface list:
 ge-0/1/0.200
Statistics: 0 kbps, 0 pps, 1 packets
Next-hop ID: 1048577
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: 240 seconds

```

### show multicast snooping route instance vs

```

user@host> show multicast snooping route instance vs
Nexthop Bulking: ON

Family: INET

Group: 224.0.0.0
 Bridge-domain: vsid500

Group: 225.1.0.1
 Bridge-domain: vsid500
 Downstream interface list: vsid500
 ge-0/3/8.500 ge-1/1/9.500 ge1/2/5.500

```

### show multicast snooping route extensive

```

user@host> show multicast snooping route extensive inet6 group ff03::1
Nexthop Bulking: OFF

Family: INET6
Group: ff03::1/128
Source: ::
Bridge-domain: BD-1
Mesh-group: __all_ces__
Downstream interface list:
 ae0.1 -(562) 1048576
Statistics: 2697 kbps, 3875 pps, 758819039 packets
Next-hop ID: 1048605
Route state: Active
Forwarding state: Forwarding

Group: ff03::1/128
Source: 6666::2/128
Bridge-domain: BD-1
Mesh-group: __all_ces__

```

```
Downstream interface list:
 ae0.1 -(562) 1048576
Statistics: 0 kbps, 0 pps, 0 packets
Next-hop ID: 1048605
Route state: Active
Forwarding state: Forwarding
```

## show multicast statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show multicast statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display IP multicast statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>none</b>—Display multicast statistics for all supported address families for all routing instances.</p> <p><b>inet   inet6</b>—(Optional) Display multicast statistics for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display statistics for a specific routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>   | The input and output interface multicast statistics are consistent, but not timely. They are constructed from the forwarding statistics, which are gathered at 30-second intervals. Therefore, the output from this command always lags the true count by up to 30 seconds.                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear multicast statistics on page 1469</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">show multicast statistics on page 1587</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | <a href="#">Table 120 on page 1585</a> describes the output fields for the <b>show multicast statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                             |

**Table 120: show multicast statistics Output Fields**

| Field Name       | Field Description                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------|
| Family           | Protocol family for which multicast statistics are displayed: <b>INET</b> or <b>INET6</b> .                               |
| Interface        | Name of the interface for which statistics are being reported.                                                            |
| Routing Protocol | Primary multicast protocol on the interface: <b>PIM</b> , <b>DVMRP</b> for <b>INET</b> , or <b>PIM</b> for <b>INET6</b> . |
| Mismatch         | Number of multicast packets that did not arrive on the correct upstream interface.                                        |
| Kernel Resolve   | Number of resolve requests processed by the primary multicast protocol on the interface.                                  |

Table 120: show multicast statistics Output Fields (*continued*)

| Field Name                                                                    | Field Description                                                                                                                                                      |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Resolve No Route</b>                                                       | Number of resolve requests that were ignored because there was no route to the source.                                                                                 |
| <b>In Kbytes</b>                                                              | Total accumulated incoming packets (in KB) since the last time the <b>clear multicast statistics</b> command was issued.                                               |
| <b>Out Kbytes</b>                                                             | Total accumulated outgoing packets (in KB) since the last time the <b>clear multicast statistics</b> command was issued.                                               |
| <b>Mismatch error</b>                                                         | Number of mismatches that were ignored because of internal errors.                                                                                                     |
| <b>Mismatch No Route</b>                                                      | Number of mismatches that were ignored because there was no route to the source.                                                                                       |
| <b>Routing Notify</b>                                                         | Number of times that the multicast routing system has been notified of a new multicast source by a multicast routing protocol .                                        |
| <b>Resolve Error</b>                                                          | Number of resolve requests that were ignored because of internal errors.                                                                                               |
| <b>In Packets</b>                                                             | Total number of incoming packets since the last time the <b>clear multicast statistics</b> command was issued.                                                         |
| <b>Out Packets</b>                                                            | Total number of outgoing packets since the last time the <b>clear multicast statistics</b> command was issued.                                                         |
| <b>Resolve requests on interfaces not enabled for multicast <i>n</i></b>      | Number of resolve requests on interfaces that are not enabled for multicast that have accumulated since the <b>clear multicast statistics</b> command was last issued. |
| <b>Resolve requests with no route to source <i>n</i></b>                      | Number of resolve requests with no route to the source that have accumulated since the <b>clear multicast statistics</b> command was last issued.                      |
| <b>Routing notifications on interfaces not enabled for multicast <i>n</i></b> | Number of routing notifications on interfaces not enabled for multicast that have accumulated since the <b>clear multicast statistics</b> command was last issued.     |
| <b>Routing notifications with no route to source <i>n</i></b>                 | Number of routing notifications with no route to the source that have accumulated since the <b>clear multicast statistics</b> command was last issued.                 |
| <b>Interface Mismatches on interfaces not enabled for multicast <i>n</i></b>  | Number of interface mismatches on interfaces not enabled for multicast that have accumulated since the <b>clear multicast statistics</b> command was last issued.      |
| <b>Group Membership on interfaces not enabled for multicast <i>n</i></b>      | Number of group memberships on interfaces not enabled for multicast that have accumulated since the <b>clear multicast statistics</b> command was last issued.         |

## Sample Output

### show multicast statistics

```

user@host> show multicast statistics
Address family: INET
Interface: fe-0/0/0
 Routing Protocol: PIM Mismatch error: 0
 Mismatch: 0 Mismatch No Route: 0
 Kernel Resolve: 10 Routing Notify: 0
 Resolve No Route: 0 Resolve Error: 0
 In Kbytes: 4641 In Packets: 50454
 Out Kbytes: 0 Out Packets: 0
Interface: so-0/1/1.0
 Routing Protocol: PIM Mismatch error: 0
 Mismatch: 0 Mismatch No Route: 0
 Kernel Resolve: 0 Routing Notify: 0
 Resolve No Route: 0 Resolve Error: 0
 In Kbytes: 0 In Packets: 0
 Out Kbytes: 4641 Out Packets: 50454

Resolve requests on interfaces not enabled for multicast 0
Resolve requests with no route to source 0
Routing notifications on interfaces not enabled for multicast 0
Routing notifications with no route to source 0
Interface Mismatches on interfaces not enabled for multicast 0
Group Membership on interfaces not enabled for multicast 25

Address family: INET6
Interface: fe-0/0/0.0
 Routing Protocol: PIM Mismatch error: 0
 Mismatch: 0 Mismatch No Route: 0
 Kernel Resolve: 0 Routing Notify: 0
 Resolve No Route: 0 Resolve Error: 0
 In Kbytes: 0 In Packets: 0
 Out Kbytes: 0 Out Packets: 0
Interface: so-0/1/1.0
 Routing Protocol: PIM Mismatch error: 0
 Mismatch: 0 Mismatch No Route: 0
 Kernel Resolve: 0 Routing Notify: 0
 Resolve No Route: 0 Resolve Error: 0
 In Kbytes: 0 In Packets: 0
 Out Kbytes: 0 Out Packets: 0

Resolve requests on interfaces not enabled for multicast 0
Resolve requests with no route to source 0
Routing notifications on interfaces not enabled for multicast 0
Routing notifications with no route to source 0
Interface Mismatches on interfaces not enabled for multicast 0
Group Membership on interfaces not enabled for multicast 0

```

## show multicast usage

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1588</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1588</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                       | <pre>show multicast usage &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast usage &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                                  | Display usage information about the 10 most active Distance Vector Multicast Routing Protocol (DVMRP) or Protocol Independent Multicast (PIM) groups.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                                      | <p><b>none</b>—Display multicast usage information for all supported address families for all routing instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display usage information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the most active DVMRP or PIM groups for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                        | <a href="#">show multicast usage on page 1589</a><br><a href="#">show multicast usage brief on page 1589</a><br><a href="#">show multicast usage instance on page 1589</a><br><a href="#">show multicast usage detail on page 1590</a>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>                                | <a href="#">Table 121 on page 1589</a> describes the output fields for the <b>show multicast usage</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 121: show multicast usage Output Fields

| Field Name      | Field Description                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b> | Name of the routing instance. (Displayed when multicast is configured within a routing instance.)                                                                                        |
| <b>Group</b>    | Group address.                                                                                                                                                                           |
| <b>Sources</b>  | Number of sources.                                                                                                                                                                       |
| <b>Packets</b>  | Number of packets that have been forwarded to this prefix. If one or more of the packets forwarded statistic queries fails or times out, the packets field displays <b>unavailable</b> . |
| <b>Bytes</b>    | Number of bytes that have been forwarded to this prefix. If one or more of the packets forwarded statistic queries fails or times out, the bytes field displays <b>unavailable</b> .     |
| <b>Prefix</b>   | IP address.                                                                                                                                                                              |
| <b>/len</b>     | Prefix length.                                                                                                                                                                           |
| <b>Groups</b>   | Number of multicast groups.                                                                                                                                                              |

## Sample Output

### show multicast usage

```

user@host> show multicast usage
Group Sources Packets Bytes
228.0.0.0 1 52847 4439148
239.1.1.1 2 13450 1125530

Prefix /len Groups Packets Bytes
10.255.14.144 /32 2 66254 5561304
10.255.70.15 /32 1 43 3374...
```

### show multicast usage brief

The output for the **show multicast usage brief** command is identical to that for the **show multicast usage** command. For sample output, see [show multicast usage on page 1589](#).

### show multicast usage instance

```

user@host> show multicast usage instance VPN-A
Group Sources Packets Bytes
224.2.127.254 1 5538 509496
224.0.1.39 1 13 624
224.0.1.40 1 13 624

Prefix /len Groups Packets Bytes
192.168.195.34 /32 1 5538 509496
10.255.14.30 /32 1 13 624
```

```
10.255.245.91 /32 1 13 624
...
```

#### show multicast usage detail

```
user@host> show multicast usage detail
Group Sources Packets Bytes
228.0.0.0 1 53159 4465356
 Source: 10.255.14.144 /32 Packets: 53159 Bytes: 4465356
239.1.1.1 2 13450 1125530
 Source: 10.255.14.144 /32 Packets: 13407 Bytes: 1122156
 Source: 10.255.70.15 /32 Packets: 43 Bytes: 3374
```

```
Prefix /len Groups Packets Bytes
10.255.14.144 /32 2 66566 5587512
 Group: 228.0.0.0 Packets: 53159 Bytes: 4465356
 Group: 239.1.1.1 Packets: 13407 Bytes: 1122156
10.255.70.15 /32 1 43 3374
 Group: 239.1.1.1 Packets: 43 Bytes: 3374
```



## show pim bootstrap

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1591</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1591</a>                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                                       | <pre>show pim bootstrap &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim bootstrap &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                  |
| <b>Description</b>                                  | For sparse mode only, display information about Protocol Independent Multicast (PIM) bootstrap routers.                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                                      | <p><b>none</b>—Display PIM bootstrap router information for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about bootstrap routers for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>                        | <a href="#">show pim bootstrap on page 1592</a><br><a href="#">show pim bootstrap instance on page 1592</a>                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>                                | <p><a href="#">Table 122 on page 1591</a> describes the output fields for the <b>show pim bootstrap</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                       |

**Table 122: show pim bootstrap Output Fields**

| Field Name           | Field Description                                                            |
|----------------------|------------------------------------------------------------------------------|
| <b>Instance</b>      | Name of the routing instance.                                                |
| <b>BSR</b>           | Bootstrap router.                                                            |
| <b>Pri</b>           | Priority of the routing device as elected to be the bootstrap router.        |
| <b>Local address</b> | Local routing device address.                                                |
| <b>Pri</b>           | Local routing device address priority to be elected as the bootstrap router. |

Table 122: show pim bootstrap Output Fields (*continued*)

| Field Name     | Field Description                                                                                    |
|----------------|------------------------------------------------------------------------------------------------------|
| <b>State</b>   | Local routing device election state: <b>Candidate</b> , <b>Elected</b> , or <b>Ineligible</b> .      |
| <b>Timeout</b> | How long until the local routing device declares the bootstrap router to be unreachable, in seconds. |

## Sample Output

### show pim bootstrap

```
user@host> show pim bootstrap
Instance: PIM.master
```

| BSR                     | Pri | Local address           | Pri | State      | Timeout |
|-------------------------|-----|-------------------------|-----|------------|---------|
| None                    | 0   | 10.255.71.46            | 0   | InEligible | 0       |
| feco:1:1:1:1:0:aff:785c | 34  | feco:1:1:1:1:0:aff:7c12 | 0   | InEligible | 0       |

### show pim bootstrap instance

```
user@host> show pim bootstrap instance VPN-A
Instance: PIM.VPN-A
```

| BSR  | Pri | Local address   | Pri | State      | Timeout |
|------|-----|-----------------|-----|------------|---------|
| None | 0   | 192.168.196.105 | 0   | InEligible | 0       |

## show pim interfaces

**List of Syntax** [Syntax on page 1593](#)  
[Syntax \(EX Series Switch and the QFX Series\) on page 1593](#)

**Syntax** show pim interfaces  
 <inet | inet6>  
 <instance *instance-name*>  
 <logical-system (all | *logical-system-name*)>

**Syntax (EX Series Switch and the QFX Series)** show pim interfaces  
 <inet | inet6>  
 <instance *instance-name*>

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.  
**inet6** and **instance** options introduced in Junos OS Release 10.0 for EX Series switches.  
 Command introduced in Junos OS Release 11.3 for the QFX Series.  
 Support for bidirectional PIM added in Junos OS Release 12.1.

**Description** Display information about the interfaces on which Protocol Independent Multicast (PIM) is configured.

**Options** **none**—Display interface information for all family addresses for all routing instances.

**inet | inet6**—(Optional) Display interface information for IPv4 or IPv6 family addresses, respectively.

**instance *instance-name***—(Optional) Display information about interfaces for a specific PIM-enabled routing instance.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**Required Privilege Level** view

**List of Sample Output** [show pim interfaces on page 1594](#)

**Output Fields** [Table 123 on page 1593](#) describes the output fields for the **show pim interfaces** command. Output fields are listed in the approximate order in which they appear.

Table 123: show pim interfaces Output Fields

| Field Name | Field Description                                                                          |
|------------|--------------------------------------------------------------------------------------------|
| Instance   | Name of the routing instance.                                                              |
| Name       | Interface name.                                                                            |
| State      | State of the interface. The state also is displayed in the <b>show interfaces</b> command. |

Table 123: show pim interfaces Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mode</b>         | <p>PIM mode running on the interface:</p> <ul style="list-style-type: none"> <li>• <b>B</b>—In bidirectional mode, multicast groups are carried across the network over bidirectional shared trees. This type of tree minimizes PIM routing state, which is especially important in networks with numerous and dispersed senders and receivers.</li> <li>• <b>S</b>—In sparse mode, routing devices must join and leave multicast groups explicitly. Upstream routing devices do not forward multicast traffic to this routing device unless this device has sent an explicit request (using a join message) to receive multicast traffic.</li> <li>• <b>Dense</b>—Unlike sparse mode, where data is forwarded only to routing devices sending an explicit request, dense mode implements a flood-and-prune mechanism, similar to DVMRP (the first multicast protocol used to support the multicast backbone). (Not supported on QFX Series.)</li> <li>• <b>Sparse-Dense</b>—Sparse-dense mode allows the interface to operate on a per-group basis in either sparse or dense mode. A group specified as <b>dense</b> is not mapped to a rendezvous point (RP). Instead, data packets destined for that group are forwarded using PIM-Dense Mode (PIM-DM) rules. A group specified as <b>sparse</b> is mapped to an RP, and data packets are forwarded using PIM-Sparse Mode (PIM-SM) rules. (Not supported on QFX Series.)</li> </ul> <p>When sparse-dense mode is configured, the output includes both <b>S</b> and <b>D</b>. When bidirectional-sparse mode is configured, the output includes <b>S</b> and <b>B</b>. When bidirectional-sparse-dense mode is configured, the output includes <b>B</b>, <b>S</b>, and <b>D</b>.</p> |
| <b>IP</b>           | Version number of the address family on the interface: <b>4</b> (IPv4) or <b>6</b> (IPv6).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>V</b>            | PIM version running on the interface: 1 or 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>State</b>        | <p>State of PIM on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Bidirectional mode is enabled on the interface and on all PIM neighbors.</li> <li>• <b>DR</b>—Designated router.</li> <li>• <b>NotCap</b>—Bidirectional mode is not enabled on the interface. This can happen when bidirectional PIM is not configured locally, when one of the neighbors is not configured for bidirectional PIM, or when one of the neighbors has not implemented the bidirectional PIM protocol.</li> <li>• <b>NotDR</b>—Not the designated router.</li> <li>• <b>P2P</b>—Point to point.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>NbrCnt</b>       | Number of neighbors that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>JoinCnt(sg)</b>  | Number of (s,g) join messages that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>JointCnt(*g)</b> | Number of (*g) join messages that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>DR address</b>   | Address of the designated router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### show pim interfaces

```

user@host> show pim interfaces
Stat = Status, V = Version, NbrCnt = Neighbor Count,
S = Sparse, D = Dense, B = Bidirectional,
DR = Designated Router, P2P = Point-to-point link,

```

Active = Bidirectional is active, NotCap = Not Bidirectional Capable

| Name           | Stat | Mode | IP | V | State        | NbrCnt | JoinCnt(sg/*g) | DR address |
|----------------|------|------|----|---|--------------|--------|----------------|------------|
| ge-0/3/0.0     | Up   | S    | 4  | 2 | NotDR,NotCap | 1      | 0/0            | 40.0.0.3   |
| ge-0/3/3.50    | Up   | S    | 4  | 2 | DR,NotCap    | 1      | 9901/100       | 50.0.0.2   |
| ge-0/3/3.51    | Up   | S    | 4  | 2 | DR,NotCap    | 1      | 0/0            | 51.0.0.2   |
| pe-1/2/0.32769 | Up   | S    | 4  | 2 | P2P,NotCap   | 0      | 0/0            |            |

## show pim join

---

**List of Syntax**   [Syntax on page 1596](#)  
[Syntax \(EX Series Switch and the QFX Series\) on page 1596](#)

**Syntax**   `show pim join`  
          `<brief | detail | extensive | summary>`  
          `<bidirectional | dense | sparse>`  
          `<exact>`  
          `<inet | inet6>`  
          `<instance instance-name>`  
          `<logical-system (all | logical-system-name)>`  
          `<range>`  
          `<rp ip-address/prefix | source ip-address/prefix>`  
          `<sg | star-g>`

**Syntax (EX Series Switch and the QFX Series)**   `show pim join`  
                                                          `<brief | detail | extensive | summary>`  
                                                          `<dense | sparse>`  
                                                          `<exact>`  
                                                          `<inet | inet6>`  
                                                          `<instance instance-name>`  
                                                          `<range>`  
                                                          `<rp ip-address/prefix | source ip-address/prefix>`  
                                                          `<sg | star-g>`

**Release Information**   Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              **summary** option introduced in Junos OS Release 9.6.  
                              **inet6** and **instance** options introduced in Junos OS Release 10.0 for EX Series switches.  
                              Support for bidirectional PIM added in Junos OS Release 12.1.  
                              Command introduced in Junos OS Release 11.3 for the QFX Series.  
                              Multiple new filter options introduced in Junos OS Release 13.2.  
                              Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**   Display information about Protocol Independent Multicast (PIM) groups for all PIM modes.

For bidirectional PIM, display information about PIM group ranges (\*G-range) for each active bidirectional RP group range, in addition to each of the joined (\*G) routes.

**Options**   **none**—Display the standard information about PIM groups for all supported family addresses for all routing instances.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**bidirectional | dense | sparse**—(Optional) Display information about PIM bidirectional mode, dense mode, or sparse and source-specific multicast (SSM) mode entries.

**exact**—(Optional) Display information about only the group that exactly matches the specified group address.

**inet | inet6**—(Optional) Display PIM group information for IPv4 or IPv6 family addresses, respectively.

**instance *instance-name***—(Optional) Display information about groups for the specified PIM-enabled routing instance only.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**range**—(Optional) Address range of the group, specified as *prefix/prefix-length*.

**rp *ip-address/prefix* | source *ip-address/prefix***—(Optional) Display information about the PIM entries with a specified rendezvous point (RP) address and prefix or with a specified source address and prefix. You can omit the prefix.

**sg | star-g**—(Optional) Display information about PIM (S,G) or (\*,G) entries.

**Required Privilege Level**

view

**Related Documentation**

- [clear pim join on page 1470](#)
- [Example: Configuring Bidirectional PIM](#)

**List of Sample Output**

[show pim join summary on page 1601](#)  
[show pim join \(PIM Sparse Mode\) on page 1601](#)  
[show pim join \(Bidirectional PIM\) on page 1602](#)  
[show pim join inet6 on page 1602](#)  
[show pim join inet6 star-g on page 1603](#)  
[show pim join instance <instance-name> on page 1603](#)  
[show pim join detail on page 1603](#)  
[show pim join extensive \(PIM Sparse Mode\) on page 1604](#)  
[show pim join extensive \(Bidirectional PIM\) on page 1605](#)  
[show pim join extensive \(Bidirectional PIM with a Directly Connected Phantom RP\) on page 1606](#)  
[show pim join instance <instance-name> extensive on page 1606](#)  
[show pim join extensive \(Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 1607](#)  
[show pim join extensive \(Egress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 1608](#)  
[show pim join summary on page 1609](#)  
[show pim join \(PIM Sparse Mode\) on page 1610](#)  
[show pim join \(Bidirectional PIM\) on page 1610](#)  
[show pim join inet6 on page 1611](#)  
[show pim join inet6 star-g on page 1611](#)  
[show pim join instance <instance-name> on page 1611](#)  
[show pim join detail on page 1612](#)  
[show pim join extensive \(PIM Sparse Mode\) on page 1612](#)  
[show pim join extensive \(Bidirectional PIM\) on page 1613](#)

[show pim join extensive \(Bidirectional PIM with a Directly Connected Phantom RP\) on page 1614](#)

[show pim join instance <instance-name> extensive on page 1614](#)

[show pim join extensive \(Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 1615](#)

[show pim join extensive \(Multipoint LDP with Multicast-Only Fast Reroute\) on page 1616](#)

**Output Fields** [Table 124 on page 1598](#) describes the output fields for the **show pim join** command. Output fields are listed in the approximate order in which they appear.

**Table 124: show pim join Output Fields**

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output                            |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Instance</b>                          | Name of the routing instance.                                                                                                                                                                                                                                                                                                                                                                        | <b>brief detail extensive summary none</b> |
| <b>Family</b>                            | Name of the address family: <b>inet</b> (IPv4) or <b>inet6</b> (IPv6).                                                                                                                                                                                                                                                                                                                               | <b>brief detail extensive summary none</b> |
| <b>Route type</b>                        | Type of multicast route: (S,G) or (*,G).                                                                                                                                                                                                                                                                                                                                                             | <b>summary</b>                             |
| <b>Route count</b>                       | Number of (S,G) routes and number of (*,G) routes.                                                                                                                                                                                                                                                                                                                                                   | <b>summary</b>                             |
| <b>R</b>                                 | Rendezvous Point Tree.                                                                                                                                                                                                                                                                                                                                                                               | <b>brief detail extensive none</b>         |
| <b>S</b>                                 | Sparse.                                                                                                                                                                                                                                                                                                                                                                                              | <b>brief detail extensive none</b>         |
| <b>W</b>                                 | Wildcard.                                                                                                                                                                                                                                                                                                                                                                                            | <b>brief detail extensive none</b>         |
| <b>Group</b>                             | Group address.                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief detail extensive none</b>         |
| <b>Bidirectional group prefix length</b> | For bidirectional PIM, length of the IP prefix for RP group ranges.                                                                                                                                                                                                                                                                                                                                  | All levels                                 |
| <b>Source</b>                            | Multicast source: <ul style="list-style-type: none"> <li>• * (wildcard value)</li> <li>• <i>ipv4-address</i></li> <li>• <i>ipv6-address</i></li> </ul>                                                                                                                                                                                                                                               | <b>brief detail extensive none</b>         |
| <b>RP</b>                                | Rendezvous point for the PIM group.                                                                                                                                                                                                                                                                                                                                                                  | <b>brief detail extensive none</b>         |
| <b>Flags</b>                             | PIM flags: <ul style="list-style-type: none"> <li>• <b>bidirectional</b>—Bidirectional mode entry.</li> <li>• <b>dense</b>—Dense mode entry.</li> <li>• <b>rptree</b>—Entry is on the rendezvous point tree.</li> <li>• <b>sparse</b>—Sparse mode entry.</li> <li>• <b>spt</b>—Entry is on the shortest-path tree for the source.</li> <li>• <b>wildcard</b>—Entry is on the shared tree.</li> </ul> | <b>brief detail extensive none</b>         |



Table 124: show pim join Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output                    |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Upstream interface</b>              | <p>RPF interface toward the source address for the source-specific state (S,G) or toward the rendezvous point (RP) address for the non-source-specific state (*G).</p> <p>For bidirectional PIM, <b>RP Link</b> means that the interface is directly connected to a subnet that contains a phantom RP address.</p> <p>A pseudo multipoint LDP (M-LDP) interface appears on egress nodes in M-LDP point-to-multipoint LSPs with inband signaling.</p>                                            | <b>brief detail extensive none</b> |
| <b>Upstream neighbor</b>               | <p>Information about the upstream neighbor: <b>Direct</b>, <b>Local</b>, <b>Unknown</b>, or a specific IP address.</p> <p>For bidirectional PIM, <b>Direct</b> means that the interface is directly connected to a subnet that contains a phantom RP address.</p> <p>The multipoint LDP (M-LDP) root appears on egress nodes in M-LDP point-to-multipoint LSPs with inband signaling.</p>                                                                                                       | <b>extensive</b>                   |
| <b>Upstream state</b>                  | <p>When multicast-only fast reroute (MoFRR) is configured in a PIM domain, the upstream interface for the active path. A PIM router propagates join messages on two upstream RPF interfaces to receive multicast traffic on both links for the same join request. Preference is given to two paths that do not converge to the same immediate upstream router. PIM installs appropriate multicast routes with upstream neighbors as RPF next hops with two (primary and backup) interfaces.</p> | <b>extensive</b>                   |
| <b>Active upstream neighbor</b>        | <p>On the MoFRR primary path, the IP address of the neighbor that is directly connected to the active upstream interface.</p>                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>                   |
| <b>MoFRR Backup upstream interface</b> | <p>The MoFRR upstream interface that is used when the primary path fails.</p> <p>When the primary path fails, the backup path is upgraded to primary, and traffic is forwarded accordingly. If there are alternate paths available, a new backup path is calculated and the appropriate multicast route is updated or installed.</p>                                                                                                                                                            | <b>extensive</b>                   |

Table 124: show pim join Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Upstream state</b>       | <p>Information about the upstream interface:</p> <ul style="list-style-type: none"> <li>• <b>Join to RP</b>—Sending a join to the rendezvous point.</li> <li>• <b>Join to Source</b>—Sending a join to the source.</li> <li>• <b>Local RP</b>—Sending neither join messages nor prune messages toward the RP, because this routing device is the rendezvous point.</li> <li>• <b>Local Source</b>—Sending neither join messages nor prune messages toward the source, because the source is locally attached to this routing device.</li> <li>• <b>No Prune to RP</b>—Automatically sent to RP when SPT and RPT are on the same path.</li> <li>• <b>Prune to RP</b>—Sending a prune to the rendezvous point.</li> <li>• <b>Prune to Source</b>—Sending a prune to the source.</li> </ul> <p><b>NOTE:</b> RP group range entries have <b>None</b> in the <b>Upstream state</b> field because RP group ranges do not trigger actual PIM join messages between routing devices.</p>              | <b>extensive</b> |
| <b>Downstream neighbors</b> | <p>Information about downstream interfaces:</p> <ul style="list-style-type: none"> <li>• <b>Interface</b>—Interface name for the downstream neighbor.<br/>A pseudo PIM-SM interface appears for all IGMP-only interfaces.<br/>A pseudo multipoint LDP (M-LDP) interface appears on ingress root nodes in M-LDP point-to-multipoint LSPs with inband signaling.</li> <li>• <b>Interface address</b>—Address of the downstream neighbor.</li> <li>• <b>State</b>—Information about the downstream neighbor: <b>join</b> or <b>prune</b>.</li> <li>• <b>Flags</b>—PIM join flags: <b>R (RPtree)</b>, <b>S (Sparse)</b>, <b>W (Wildcard)</b>, or <b>zero</b>.</li> <li>• <b>Uptime</b>—Time since the downstream interface joined the group.</li> <li>• <b>Time since last Join</b>—Time since the last join message was received from the downstream interface.</li> <li>• <b>Time since last Prune</b>—Time since the last prune message was received from the downstream interface.</li> </ul> | <b>extensive</b> |
| <b>Assert Timeout</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
| <b>Assert Timeout</b>       | Length of time between assert cycles on the downstream interface. Not displayed if the assert timer is null.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>extensive</b> |

Table 124: show pim join Output Fields (*continued*)

| Field Name                                | Field Description                                                                                                                                                                                                                                                                                                             | Level of Output  |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Keepalive timeout</b>                  | Time remaining until the downstream join state is updated (in seconds). If the downstream join state is not updated before this keepalive timer reaches zero, the entry is deleted. If there is a directly connected host, <b>Keepalive timeout</b> is <b>Infinity</b> .                                                      | <b>extensive</b> |
| <b>Uptime</b>                             | Time since the creation of (S,G) or (*,G) state. The uptime is not refreshed every time a PIM join message is received for an existing (S,G) or (*,G) state.                                                                                                                                                                  | <b>extensive</b> |
| <b>Bidirectional accepting interfaces</b> | <p>Interfaces on the router that forward bidirectional PIM traffic.</p> <p>The reasons for forwarding bidirectional PIM traffic are that the interface is the winner of the designated forwarder election (<b>DF Winner</b>), or the interface is the reverse path forwarding (RPF) interface toward the RP (<b>RPF</b>).</p> | <b>extensive</b> |

## Sample Output

### show pim join summary

```

user@host> show pim join summary
Instance: PIM.master Family: INET

Route type Route count
(s,g) 2
(*,g) 1

Instance: PIM.master Family: INET6

```

### show pim join (PIM Sparse Mode)

```

user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
 Source: *
 RP: 10.255.14.144
 Flags: sparse,rptree,wildcard
 Upstream interface: Local

Group: 239.1.1.1
 Source: 10.255.14.144
 Flags: sparse,spt
 Upstream interface: Local

Group: 239.1.1.1
 Source: 10.255.70.15
 Flags: sparse,spt
 Upstream interface: so-1/0/0.0

```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join (Bidirectional PIM)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0

Group: 224.1.3.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)

Group: 225.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0

Group: 225.1.3.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join inet6

```
user@host> show pim join inet6
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
 Source: *
 RP: ::46.0.0.13
 Flags: sparse,rptree,wildcard
 Upstream interface: Local

Group: ff04::e000:101
 Source: ::1.1.1.1
 Flags: sparse
 Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
 Source: ::1.1.1.1
 Flags: sparse
 Upstream interface: unknown (no neighbor)
```

```

Group: ff04::e800:101
Source: ::1.1.1.2
Flags: sparse
Upstream interface: unknown (no neighbor)

```

### show pim join inet6 star-g

```

user@host> show pim join inet6 star-g
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
Source: *
RP: ::46.0.0.13
Flags: sparse,rptree,wildcard
Upstream interface: Local

```

### show pim join instance <instance-name>

```

user@host> show pim join instance VPN-A
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
Source: *
RP: 10.10.47.100
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 235.1.1.2
Source: 192.168.195.74
Flags: sparse,spt
Upstream interface: at-0/3/1.0

Group: 235.1.1.2
Source: 192.168.195.169
Flags: sparse
Upstream interface: so-1/0/1.0

Instance: PIM.VPN-A Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

### show pim join detail

```

user@host> show pim join detail
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.70.15

```

```
Flags: sparse,spt
Upstream interface: so-1/0/0.0
```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join extensive (PIM Sparse Mode)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
 Source: *
 RP: 10.255.14.144
 Flags: sparse,rptree,wildcard
 Upstream interface: Local
 Upstream neighbor: Local
 Upstream state: Local RP
 Uptime: 00:03:49
 Downstream neighbors:
 Interface: so-1/0/0.0
 10.111.10.2 State: Join Flags: SRW Timeout: 174
 Uptime: 00:03:49 Time since last Join: 00:01:49
 Interface: mt-1/1/0.32768
 10.10.47.100 State: Join Flags: SRW Timeout: Infinity
 Uptime: 00:03:49 Time since last Join: 00:01:49
 Number of downstream interfaces: 2

Group: 239.1.1.1
 Source: 10.255.14.144
 Flags: sparse,spt
 Upstream interface: Local
 Upstream neighbor: Local
 Upstream state: Local Source, Local RP
 Keepalive timeout: 344
 Uptime: 00:03:49
 Downstream neighbors:
 Interface: so-1/0/0.0
 10.111.10.2 State: Join Flags: S Timeout: 174
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Interface: mt-1/1/0.32768
 10.10.47.100 State: Join Flags: S Timeout: Infinity
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Number of downstream interfaces: 2

Group: 239.1.1.1
 Source: 10.255.70.15
 Flags: sparse,spt
 Upstream interface: so-1/0/0.0
 Upstream neighbor: 10.111.10.2
 Upstream state: Local RP, Join to Source
 Keepalive timeout: 344
 Uptime: 00:03:49
 Downstream neighbors:
 Interface: Pseudo-GMP
 fe-0/0/0.0 fe-0/0/1.0 fe-0/0/3.0
 Interface: so-1/0/0.0 (pruned)
 10.111.10.2 State: Prune Flags: SR Timeout: 174
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Interface: mt-1/1/0.32768
```

```

10.10.47.100 State: Join Flags: S Timeout: Infinity
Uptime: 00:03:49 Time since last Prune: 00:01:49
Number of downstream interfaces: 3

```

```

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

### show pim join extensive (Bidirectional PIM)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

```

Group: 224.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0
 Upstream neighbor: 10.10.1.2
 Upstream state: None
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Number of downstream interfaces: 0

Group: 225.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0
 Upstream neighbor: 10.10.1.2
 Upstream state: None
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Downstream neighbors:
 Interface: lt-1/0/10.24
 10.0.24.4 State: Join RW Timeout: 185
 Interface: lt-1/0/10.23
 10.0.23.3 State: Join RW Timeout: 184
 Number of downstream interfaces: 2

Group: 225.1.3.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)
 Upstream neighbor: Direct
 Upstream state: Local RP
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Interface: xe-4/1/0.0 (DF Winner)
 Number of downstream interfaces: 0

```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join extensive (Bidirectional PIM with a Directly Connected Phantom RP)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.1
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)
 Upstream neighbor: Direct
 Upstream state: Local RP
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Interface: xe-4/1/0.0 (DF Winner)
 Number of downstream interfaces: 0
```

### show pim join instance <instance-name> extensive

```
user@host> show pim join instance VPN-A extensive
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
 Source: *
 RP: 10.10.47.100
 Flags: sparse,rptree,wildcard
 Upstream interface: Local
 Upstream neighbor: Local
 Upstream state: Local RP
 Uptime: 00:03:49
 Downstream neighbors:
 Interface: mt-1/1/0.32768
 10.10.47.101 State: Join Flags: SRW Timeout: 156
 Uptime: 00:03:49 Time since last Join: 00:01:49
 Number of downstream interfaces: 1

Group: 235.1.1.2
 Source: 192.168.195.74
 Flags: sparse,spt
 Upstream interface: at-0/3/1.0
 Upstream neighbor: 10.111.30.2
 Upstream state: Local RP, Join to Source
 Keepalive timeout: 156
 Uptime: 00:14:52

Group: 235.1.1.2
 Source: 192.168.195.169
 Flags: sparse
 Upstream interface: so-1/0/1.0
 Upstream neighbor: 10.111.20.2
 Upstream state: Local RP, Join to Source
 Keepalive timeout: 156
 Uptime: 00:14:52
```



**show pim join extensive (Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)**

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 232.1.1.1
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream interface: fe-1/3/1.0
 Upstream neighbor: Direct
 Upstream state: Local Source
 Keepalive timeout:
 Uptime: 11:27:55
 Downstream neighbors:
 Interface: Pseudo-MLDP
 Interface: lt-1/2/0.25
 1.2.5.2 State: Join Flags: S Timeout: Infinity
 Uptime: 11:27:55 Time since last Join: 11:27:55

Group: 232.1.1.2
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream interface: fe-1/3/1.0
 Upstream neighbor: Direct
 Upstream state: Local Source
 Keepalive timeout:
 Uptime: 11:27:41
 Downstream neighbors:
 Interface: Pseudo-MLDP

Group: 232.1.1.3
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream interface: fe-1/3/1.0
 Upstream neighbor: Direct
 Upstream state: Local Source
 Keepalive timeout:
 Uptime: 11:27:41
 Downstream neighbors:
 Interface: Pseudo-MLDP

Group: 232.2.2.2
 Source: 1.2.7.7
 Flags: sparse,spt
 Upstream interface: lt-1/2/0.27
 Upstream neighbor: Direct
 Upstream state: Local Source
 Keepalive timeout:
 Uptime: 11:27:25
 Downstream neighbors:
 Interface: Pseudo-MLDP

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
 Source: abcd::1:2:7:7
 Flags: sparse,spt
 Upstream interface: lt-1/2/0.27
 Upstream neighbor: Direct

```

```
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:26
Downstream neighbors:
 Interface: Pseudo-MLDP
```

### show pim join extensive (Egress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 227.1.1.1
 Source: *
 RP: 1.1.1.1
 Flags: sparse,rptree,wildcard
 Upstream interface: Local
 Upstream neighbor: Local
 Upstream state: Local RP
 Uptime: 11:31:33
 Downstream neighbors:
 Interface: fe-1/3/0.0
 192.168.209.9 State: Join Flags: SRW Timeout: Infinity
 Uptime: 11:31:33 Time since last Join: 11:31:32

Group: 232.1.1.1
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream protocol: MLDP
 Upstream interface: Pseudo MLDP
 Upstream neighbor: MLDP LSP root <1.1.1.2>
 Upstream state: Join to Source
 Keepalive timeout:
 Uptime: 11:31:32
 Downstream neighbors:
 Interface: so-0/1/3.0
 192.168.92.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:30 Time since last Join: 11:31:30
 Downstream neighbors:
 Interface: fe-1/3/0.0
 192.168.209.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.1.1.2
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream protocol: MLDP
 Upstream interface: Pseudo MLDP
 Upstream neighbor: MLDP LSP root <1.1.1.2>
 Upstream state: Join to Source
 Keepalive timeout:
 Uptime: 11:31:32
 Downstream neighbors:
 Interface: so-0/1/3.0
 192.168.92.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:30 Time since last Join: 11:31:30
 Downstream neighbors:
 Interface: lt-1/2/0.14
 1.1.4.4 State: Join Flags: S Timeout: 177
 Uptime: 11:30:33 Time since last Join: 00:00:33
 Downstream neighbors:
```

```

Interface: fe-1/3/0.0
 192.168.209.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.1.1.3
 Source: 192.168.219.11
 Flags: sparse,spt
 Upstream protocol: MLDP
 Upstream interface: Pseudo MLDP
 Upstream neighbor: MLDP LSP root <1.1.1.2>
 Upstream state: Join to Source
 Keepalive timeout:
 Uptime: 11:31:32
 Downstream neighbors:
 Interface: fe-1/3/0.0
 192.168.209.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.2.2.2
 Source: 1.2.7.7
 Flags: sparse,spt
 Upstream protocol: MLDP
 Upstream interface: Pseudo MLDP
 Upstream neighbor: MLDP LSP root <1.1.1.2>
 Upstream state: Join to Source
 Keepalive timeout:
 Uptime: 11:31:30
 Downstream neighbors:
 Interface: so-0/1/3.0
 192.168.92.9 State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:30 Time since last Join: 11:31:30

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
 Source: abcd::1:2:7:7
 Flags: sparse,spt
 Upstream protocol: MLDP
 Upstream interface: Pseudo MLDP
 Upstream neighbor: MLDP LSP root <1.1.1.2>
 Upstream state: Join to Source
 Keepalive timeout:
 Uptime: 11:31:32
 Downstream neighbors:
 Interface: fe-1/3/0.0
 fe80::21f:12ff:fea5:c4db State: Join Flags: S Timeout: Infinity
 Uptime: 11:31:32 Time since last Join: 11:31:32

```

## Sample Output

### show pim join summary

```

user@host> show pim join summary
Instance: PIM.master Family: INET

Route type Route count
(s,g) 2
(*,g) 1

Instance: PIM.master Family: INET6

```

### show pim join (PIM Sparse Mode)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.70.15
Flags: sparse,spt
Upstream interface: so-1/0/0.0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join (Bidirectional PIM)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.13.2
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0

Group: 224.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)

Group: 225.1.1.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.13.2
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0

Group: 225.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

**show pim join inet6**

```

user@host> show pim join inet6
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
 Source: *
 RP: ::46.0.0.13
 Flags: sparse,rptree,wildcard
 Upstream interface: Local

Group: ff04::e000:101
 Source: ::1.1.1.1
 Flags: sparse
 Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
 Source: ::1.1.1.1
 Flags: sparse
 Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
 Source: ::1.1.1.2
 Flags: sparse
 Upstream interface: unknown (no neighbor)

```

**show pim join inet6 star-g**

```

user@host> show pim join inet6 star-g
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
 Source: *
 RP: ::46.0.0.13
 Flags: sparse,rptree,wildcard
 Upstream interface: Local

```

**show pim join instance <instance-name>**

```

user@host> show pim join instance VPN-A
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
 Source: *
 RP: 10.10.47.100
 Flags: sparse,rptree,wildcard
 Upstream interface: Local

Group: 235.1.1.2
 Source: 192.168.195.74
 Flags: sparse,spt
 Upstream interface: at-0/3/1.0

Group: 235.1.1.2
 Source: 192.168.195.169
 Flags: sparse
 Upstream interface: so-1/0/1.0

```

```
Instance: PIM.VPN-A Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join detail

```
user@host> show pim join detail
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.70.15
Flags: sparse,spt
Upstream interface: so-1/0/0.0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join extensive (PIM Sparse Mode)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local
Upstream neighbor: Local
Upstream state: Local RP
Uptime: 00:03:49
Downstream neighbors:
 Interface: so-1/0/0.0
 10.111.10.2 State: Join Flags: SRW Timeout: 174
 Uptime: 00:03:49 Time since last Join: 00:01:49
 Interface: mt-1/1/0.32768
 10.10.47.100 State: Join Flags: SRW Timeout: Infinity
 Uptime: 00:03:49 Time since last Join: 00:01:49
Number of downstream interfaces: 2

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local
Upstream neighbor: Local
Upstream state: Local Source, Local RP
Keepalive timeout: 344
Uptime: 00:03:49
Downstream neighbors:
 Interface: so-1/0/0.0
```

```

 10.111.10.2 State: Join Flags: S Timeout: 174
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Interface: mt-1/1/0.32768
 10.10.47.100 State: Join Flags: S Timeout: Infinity
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Number of downstream interfaces: 2

Group: 239.1.1.1
Source: 10.255.70.15
Flags: sparse,spt
Upstream interface: so-1/0/0.0
Upstream neighbor: 10.111.10.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 344
Uptime: 00:03:49
Downstream neighbors:
 Interface: Pseudo-GMP
 fe-0/0/0.0 fe-0/0/1.0 fe-0/0/3.0
 Interface: so-1/0/0.0 (pruned)
 10.111.10.2 State: Prune Flags: SR Timeout: 174
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Interface: mt-1/1/0.32768
 10.10.47.100 State: Join Flags: S Timeout: Infinity
 Uptime: 00:03:49 Time since last Prune: 00:01:49
 Number of downstream interfaces: 3

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

#### show pim join extensive (Bidirectional PIM)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0
 Upstream neighbor: 10.10.1.2
 Upstream state: None
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Number of downstream interfaces: 0

Group: 225.1.1.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.13.2
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0
 Upstream neighbor: 10.10.1.2
 Upstream state: None
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)

```

```
Downstream neighbors:
 Interface: lt-1/0/10.24
 10.0.24.4 State: Join RW Timeout: 185
 Interface: lt-1/0/10.23
 10.0.23.3 State: Join RW Timeout: 184
 Number of downstream interfaces: 2

Group: 225.1.3.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)
 Upstream neighbor: Direct
 Upstream state: Local RP
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Interface: xe-4/1/0.0 (DF Winner)
 Number of downstream interfaces: 0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join extensive (Bidirectional PIM with a Directly Connected Phantom RP)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.3.0
 Bidirectional group prefix length: 24
 Source: *
 RP: 10.10.1.3
 Flags: bidirectional,rptree,wildcard
 Upstream interface: ge-0/0/1.0 (RP Link)
 Upstream neighbor: Direct
 Upstream state: Local RP
 Uptime: 00:03:49
 Bidirectional accepting interfaces:
 Interface: ge-0/0/1.0 (RPF)
 Interface: lo0.0 (DF Winner)
 Interface: xe-4/1/0.0 (DF Winner)
 Number of downstream interfaces: 0
```

#### show pim join instance <instance-name> extensive

```
user@host> show pim join instance VPN-A extensive
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
 Source: *
 RP: 10.10.47.100
 Flags: sparse,rptree,wildcard
 Upstream interface: Local
 Upstream neighbor: Local
 Upstream state: Local RP
 Uptime: 00:03:49
 Downstream neighbors:
```



```

Interface: mt-1/1/0.32768
10.10.47.101 State: Join Flags: SRW Timeout: 156
Uptime: 00:03:49 Time since last Join: 00:01:49
Number of downstream interfaces: 1

```

```

Group: 235.1.1.2
Source: 192.168.195.74
Flags: sparse,spt
Upstream interface: at-0/3/1.0
Upstream neighbor: 10.111.30.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 156
Uptime: 00:14:52

```

```

Group: 235.1.1.2
Source: 192.168.195.169
Flags: sparse
Upstream interface: so-1/0/1.0
Upstream neighbor: 10.111.20.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 156
Uptime: 00:14:52

```

#### show pim join extensive (Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 232.1.1.1
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:55
Downstream neighbors:
Interface: Pseudo-MLDP
Interface: lt-1/2/0.25
1.2.5.2 State: Join Flags: S Timeout: Infinity
Uptime: 11:27:55 Time since last Join: 11:27:55

Group: 232.1.1.2
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:41
Downstream neighbors:
Interface: Pseudo-MLDP

Group: 232.1.1.3
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:

```

```

Uptime: 11:27:41
Downstream neighbors:
 Interface: Pseudo-MLDP

Group: 232.2.2.2
Source: 1.2.7.7
Flags: sparse,spt
Upstream interface: lt-1/2/0.27
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:25
Downstream neighbors:
 Interface: Pseudo-MLDP

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
Source: abcd::1:2:7:7
Flags: sparse,spt
Upstream interface: lt-1/2/0.27
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:26
Downstream neighbors:
 Interface: Pseudo-MLDP

```

#### show pim join extensive (Multipoint LDP with Multicast-Only Fast Reroute)

```

user@host> show pim join 225.1.1.1 extensive sg
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 225.1.1.1
Source: 10.0.0.1
Flags: sparse,spt
Active upstream interface: fe-1/2/13.0
Active upstream neighbor: 10.0.0.9
MoFRR Backup upstream interface: fe-1/2/14.0
MoFRR Backup upstream neighbor: 10.0.0.21
Upstream state: Join to Source, No Prune to RP
Keepalive timeout: 354
Uptime: 00:00:06
Downstream neighbors:
 Interface: fe-1/2/15.0
 10.0.0.13 State: Join Flags: S Timeout: Infinity
 Uptime: 00:00:06 Time since last Join: 00:00:06
Number of downstream interfaces: 1

```

## show pim mdt

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show pim mdt instance <i>instance-name</i><br><brief   detail   extensive><br><incoming   outgoing><br><logical-system (all   logical-system-name)><br><range>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display information about Protocol Independent Multicast (PIM) default multicast distribution tree (MDT) and the data MDTs in a Layer 3 VPN environment for a routing instance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>instance <i>instance-name</i></b>—Display information about data-MDTs for a specific PIM-enabled routing instance.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>incoming   outgoing</b>—(Optional) Display incoming or outgoing multicast data tunnels, respectively.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>range</b>—(Optional) Display information about an IP address with optional prefix length representing a particular multicast group.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show pim mdt instance on page 1618</a><br><a href="#">show pim mdt instance detail on page 1619</a><br><a href="#">show pim mdt instance extensive on page 1619</a><br><a href="#">show pim mdt instance incoming on page 1619</a><br><a href="#">show pim mdt instance outgoing on page 1619</a><br><a href="#">show pim mdt instance (SSM Mode) on page 1620</a>                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>            | <a href="#">Table 125 on page 1617</a> describes the output fields for the <b>show pim mdt</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 125: show pim mdt Output Fields

| Field Name       | Field Description                                                                               | Level of Output |
|------------------|-------------------------------------------------------------------------------------------------|-----------------|
| Instance         | Name of the routing instance.                                                                   | All levels      |
| Tunnel direction | Direction the tunnel faces, from the router's perspective: <b>Outgoing</b> or <b>Incoming</b> . | All levels      |
| Tunnel mode      | Mode the tunnel is operating in: <b>PIM-SSM</b> or <b>PIM-ASM</b> .                             | All levels      |

Table 125: show pim mdt Output Fields (*continued*)

| Field Name                        | Field Description                                                                                                                                                                    | Level of Output |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Default group address</b>      | Default multicast group address using this tunnel.                                                                                                                                   | All levels      |
| <b>Default source address</b>     | Default multicast source address using this tunnel.                                                                                                                                  | All levels      |
| <b>Default tunnel interface</b>   | Default multicast tunnel interface.                                                                                                                                                  | All levels      |
| <b>Default tunnel source</b>      | Address used as the source address for outgoing PIM control messages.                                                                                                                | All levels      |
| <b>C-Group</b>                    | Customer-facing multicast group address using this tunnel. If you enable dynamic reuse of data MDT group addresses, more than one group address can use the same data MDT.           | <b>detail</b>   |
| <b>C-Source</b>                   | IP address of the multicast source in the customer's address space. If you enable dynamic reuse of data MDT group addresses, more than one source address can use the same data MDT. | <b>detail</b>   |
| <b>P-Group</b>                    | Service provider-facing multicast group address using this tunnel.                                                                                                                   | <b>detail</b>   |
| <b>Data tunnel interface</b>      | Multicast data tunnel interface that set up the data-MDT tunnel.                                                                                                                     | <b>detail</b>   |
| <b>Last known forwarding rate</b> | Last known rate, in kilobits per second, at which the tunnel was forwarding traffic.                                                                                                 | <b>detail</b>   |
| <b>Configured threshold rate</b>  | Rate, in kilobits per second, above which a data-MDT tunnel is created and below which it is deleted.                                                                                | <b>detail</b>   |
| <b>Tunnel uptime</b>              | Time that this data-MDT tunnel has existed. The format is <i>hours:minutes:seconds</i> .                                                                                             | <b>detail</b>   |

## Sample Output

### show pim mdt instance

```

user@host> show pim mdt instance VPN-A
Instance: PIM.VPN-A
Tunnel direction: Outgoing
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.32768
Default tunnel source: 192.168.7.1

C-group address C-source address P-group address Data tunnel interface
235.1.1.2 192.168.195.74 228.0.0.0 mt-1/1/0.32769

Instance: PIM.VPN-A
Tunnel direction: Incoming
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.1081344

```

### show pim mdt instance detail

```

user@host> show pim mdt instance VPN-A detail
Instance: PIM.VPN-A
Tunnel direction: Outgoing
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.32768
Default tunnel source: 192.168.7.1

C-Group: 235.1.1.2
 C-Source: 192.168.195.74
 P-Group : 228.0.0.0
 Data tunnel interface : mt-1/1/0.32769
 Last known forwarding rate : 48 kbps (6 kbps)
 Configured threshold rate : 10 kbps
 Tunnel uptime : 00:00:34

Instance: PIM.VPN-A
Tunnel direction: Incoming
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.1081344

```

### show pim mdt instance extensive

```

user@host> show pim mdt instance VPN-A extensive
Instance: PIM.VPN-A
Tunnel direction: Outgoing
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.32768
Default tunnel source: 192.168.7.1

C-Group: 235.1.1.2
 C-Source: 192.168.195.74
 P-Group : 228.0.0.0
 Data tunnel interface : mt-1/1/0.32769
 Last known forwarding rate : 48 kbps (6 kbps)
 Configured threshold rate : 10 kbps
 Tunnel uptime : 00:00:41

Instance: PIM.VPN-A
Tunnel direction: Incoming
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.1081344

```

### show pim mdt instance incoming

```

user@host> show pim mdt instance VPN-A incoming
Instance: PIM.VPN-A
Tunnel direction: Incoming
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.1081344

```

### show pim mdt instance outgoing

```

user@host> show pim mdt instance VPN-A outgoing
Instance: PIM.VPN-A
Tunnel direction: Outgoing
Default group address: 239.1.1.1
Default tunnel interface: mt-1/1/0.32768
Default tunnel source: 192.168.7.1

```

| C-group address | C-source address | P-group address | Data tunnel interface |
|-----------------|------------------|-----------------|-----------------------|
| 235.1.1.2       | 192.168.195.74   | 228.0.0.0       | mt-1/1/0.32769        |

#### show pim mdt instance (SSM Mode)

```
user@host> show pim mdt instance vpn-a
Instance: PIM.vpn-a
Tunnel direction: Outgoing
Tunnel mode: PIM-SSM
Default group address: 232.1.1.1
Default source address: 10.255.14.216
Default tunnel interface: mt-1/3/0.32769
Default tunnel source: 192.168.7.1

Instance: PIM.vpn-a
Tunnel direction: Incoming
Tunnel mode: PIM-SSM
Default group address: 232.1.1.1
Default source address: 10.255.14.217
Default tunnel interface: mt-1/3/0.1081345

Instance: PIM.vpn-a
Tunnel direction: Incoming
Tunnel mode: PIM-SSM
Default group address: 232.1.1.1
Default source address: 10.255.14.218
Default tunnel interface: mt-1/3/0.1081345
```

## show pim mdt data-mdt-joins

**Syntax** `show pim mdt data-mdt-joins`  
`<logical-system (all | logical-system-name)> instance instance-name`

**Release Information** Command introduced in Junos OS Release 11.2.

**Description** In a draft-rosen Layer 3 multicast virtual private network (MVPN) configured with service provider tunnels, display the advertisements of new multicast distribution tree (MDT) group addresses cached by the provider edge (PE) routers in the specified VPN routing and forwarding (VRF) instance that is configured to use the Protocol Independent Multicast (PIM) protocol.

**Options** `instance instance-name`—Display data MDT join packets cached by PE routers in a specific PIM instance.

`logical-system (all | logical-system-name)`—(Optional) Perform this operation on all logical systems or on a particular logical system.



**NOTE:** Draft-rosen multicast VPNs are not supported in a logical system environment even though the configuration statements can be configured under the logical-systems hierarchy.

**Required Privilege Level** view

**Related Documentation**

- *Understanding Data MDTs*
- *Example: Configuring Data MDTs and Provider Tunnels Operating in Source-Specific Multicast Mode*
- *Example: Configuring Data MDTs and Provider Tunnels Operating in Any-Source Multicast Mode*

**List of Sample Output** [show pim mdt data-mdt-joins on page 1622](#)

**Output Fields** [Table 126 on page 1621](#) describes the output fields for the `show pim mdt data-mdt-joins` command. Output fields are listed in the approximate order in which they appear.

**Table 126: show pim mdt data-mdt-joins Output Fields**

| Field Name      | Field Description                                                                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>C-Group</b>  | IPv4 group address in the address space of the customer's VPN-specific PIM-enabled routing instance of the multicast traffic destination. This 32-bit value is carried in the C-group field of the MDT join TLV packet. |
| <b>C-Source</b> | IPv4 address in the address space of the customer's VPN-specific PIM-enabled routing instance of the multicast traffic source. This 32-bit value is carried in the C-source field of the MDT join TLV packet.           |

Table 126: show pim mdt data-mdt-joins Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>P-Group</b>  | IPv4 group address in the service provider's address space of the new data MDT that the PE router will use to encapsulate the VPN multicast traffic flow (C-Source, C-Group). This 32-bit value is carried in the P-group field of the MDT join TLV packet. |
| <b>P-Source</b> | IPv4 address of the PE router.                                                                                                                                                                                                                              |
| <b>Timeout</b>  | Timeout, in seconds, remaining for this cache entry. When the cache entry is created, this field is set to 180 seconds. After an entry times out, the PE router deletes the entry from its cache and prunes itself off the data MDT.                        |

## Sample Output

### show pim mdt data-mdt-joins

```
user@host show pim mdt data-mdt-joins instance VPN-A
C-Source C-Group P-Source P-Group Timeout
20.2.15.9 225.1.1.2 20.0.0.5 239.10.10.0 172
20.2.15.9 225.1.1.3 20.0.0.5 239.10.10.1 172
```



## show pim mdt data-mdt-limit

**Syntax** show pim mdt data-mdt-limit instance *instance-name*  
<logical-system (all | *logical-system-name*)>

**Release Information** Command introduced in Junos OS Release 12.2.

**Description** Display the maximum number configured and the currently active data multicast distribution trees (MDTs) for a specific VPN routing and forwarding (VRF) instance.

**Options** **instance** *instance-name*—Display data MDT information for the specified VRF instance.

**logical-system** (all | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.



**NOTE:** Draft-rosen multicast VPNs are not supported in a logical system environment even though the configuration statements can be configured under the logical-systems hierarchy.

**Required Privilege Level** view

**Related Documentation**

- *Understanding Data MDTs*
- *Example: Configuring Data MDTs and Provider Tunnels Operating in Source-Specific Multicast Mode*
- *Example: Configuring Data MDTs and Provider Tunnels Operating in Any-Source Multicast Mode*

**List of Sample Output** [show pim mdt data-mdt-limit on page 1623](#)

**Output Fields** [Table 127 on page 1623](#) describes the output fields for the **show pim mdt data-mdt-limit** command. Output fields are listed in the approximate order in which they appear.

**Table 127: show pim mdt data-mdt-limit Output Fields**

| Field Name                  | Field Description                                                                                                             |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Maximum Data Tunnels</b> | Maximum number of data MDTs created in this VRF instance. If the number is 0, no data MDTs are created for this VRF instance. |
| <b>Active Data Tunnels</b>  | Active number of data MDTs in this VRF instance.                                                                              |

## Sample Output

### show pim mdt data-mdt-limit

```
user@host show pim mdt data-mdt-limit instance VPN-A
```

|                      |    |
|----------------------|----|
| Maximum Data Tunnels | 10 |
| Active Data Tunnels  | 2  |

## show pim neighbors

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1625</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1625</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                                       | <pre>show pim neighbors &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim neighbors &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p> <p>Support for the <b>instance all</b> option added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                       |
| <b>Description</b>                                  | Display information about Protocol Independent Multicast (PIM) neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                      | <p><b>none</b>—(Same as <b>brief</b>) Display standard information about PIM neighbors for all supported family addresses for the main instance.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display information about PIM neighbors for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance (<i>instance-name</i>   all)</b>—(Optional) Display information about neighbors for the specified PIM-enabled routing instance or for all routing instances.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show pim neighbors on page 1627</a><br><a href="#">show pim neighbors brief on page 1627</a><br><a href="#">show pim neighbors instance on page 1627</a><br><a href="#">show pim neighbors detail on page 1627</a><br><a href="#">show pim neighbors detail (With BFD) on page 1628</a>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                                | <p><a href="#">Table 128 on page 1626</a> describes the output fields for the <b>show pim neighbors</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 128: show pim neighbors Output Fields

| Field Name                                       | Field Description                                                                                                                                                                                                                                                                                                                                | Level of Output   |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Instance</b>                                  | Name of the routing instance.                                                                                                                                                                                                                                                                                                                    | All levels        |
| <b>Interface</b>                                 | Interface through which the neighbor is reachable.                                                                                                                                                                                                                                                                                               | All levels        |
| <b>Neighbor addr</b>                             | Address of the neighboring PIM routing device.                                                                                                                                                                                                                                                                                                   | All levels        |
| <b>IP</b>                                        | IP version: 4 or 6.                                                                                                                                                                                                                                                                                                                              | All levels        |
| <b>V</b>                                         | PIM version running on the neighbor: 1 or 2.                                                                                                                                                                                                                                                                                                     | All levels        |
| <b>Mode</b>                                      | PIM mode of the neighbor: <b>Sparse</b> , <b>Dense</b> , <b>SparseDense</b> , or <b>Unknown</b> . When the neighbor is running PIM version 2, this mode is always <b>Unknown</b> .                                                                                                                                                               | All levels        |
| <b>Option</b>                                    | Can be one or more of the following: <ul style="list-style-type: none"> <li>• <b>B</b>—Bidirectional Capable.</li> <li>• <b>G</b>—Generation Identifier.</li> <li>• <b>H</b>—Hello Option Holdtime.</li> <li>• <b>L</b>—Hello Option LAN Prune Delay.</li> <li>• <b>P</b>—Hello Option DR Priority.</li> <li>• <b>T</b>—Tracking bit.</li> </ul> | <b>brief</b> none |
| <b>Uptime</b>                                    | Time the neighbor has been operational since the PIM process was last initialized, in the format <b>dd:hh:mm:ss ago</b> for less than a week and <b>nwnd:hh:mm:ss ago</b> for more than a week.                                                                                                                                                  | All levels        |
| <b>Address</b>                                   | Address of the neighboring PIM routing device.                                                                                                                                                                                                                                                                                                   | <b>detail</b>     |
| <b>BFD</b>                                       | Status and operational state of the Bidirectional Forwarding Detection (BFD) protocol on the interface: <b>Enabled</b> , <b>Operational state is up</b> , or <b>Disabled</b> .                                                                                                                                                                   | <b>detail</b>     |
| <b>Hello Option Holdtime</b>                     | Time for which the neighbor is available, in seconds. The range of values is 0 through 65,535.                                                                                                                                                                                                                                                   | <b>detail</b>     |
| <b>Hello Default Holdtime</b>                    | Default holdtime and the time remaining if the <b>holdtime</b> option is not in the received hello message.                                                                                                                                                                                                                                      | <b>detail</b>     |
| <b>Hello Option DR Priority</b>                  | Designated router election priority. The range of values is 0 through 255.                                                                                                                                                                                                                                                                       | <b>detail</b>     |
| <b>Hello Option Generation ID</b>                | 9-digit or 10-digit number used to tag hello messages.                                                                                                                                                                                                                                                                                           | <b>detail</b>     |
| <b>Hello Option Bi-Directional PIM supported</b> | Neighbor can process bidirectional PIM messages.                                                                                                                                                                                                                                                                                                 | <b>detail</b>     |
| <b>Hello Option LAN Prune Delay</b>              | Time to wait before the neighbor receives prune messages, in the format <b>delay nnn ms override nnnn ms</b> .                                                                                                                                                                                                                                   | <b>detail</b>     |

Table 128: show pim neighbors Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                   | Level of Output |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Join Suppression supported | Neighbor is capable of join suppression.                                                                                                                                                                                                                                            | detail          |
| Rx Join                    | Information about joins received from the neighbor. <ul style="list-style-type: none"> <li><b>Group</b>—Group addresses in the join message.</li> <li><b>Source</b>—Address of the source in the join message.</li> <li><b>Timeout</b>—Time for which the join is valid.</li> </ul> | detail          |

## Sample Output

### show pim neighbors

```

user@host> show pim neighbors
Instance: PIM.master
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking bit

Interface IP V Mode Option Uptime Neighbor addr
so-1/0/0.0 4 2 HPLG 00:07:10 10.111.10.2

```

### show pim neighbors brief

The output for the **show pim neighbors brief** command is identical to that for the **show pim neighbors** command. For sample output, see [show pim neighbors on page 1627](#).

### show pim neighbors instance

```

user@host> show pim neighbors instance VPN-A
Instance: PIM.VPN-A
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking bit

Interface IP V Mode Option Uptime Neighbor addr
at-0/3/1.0 4 2 HPLG 00:07:54 10.111.30.2
mt-1/1/0.32768 4 2 HPLG 00:07:22 10.10.47.101
so-1/0/1.0 4 2 HPLG 00:07:50 10.111.20.2

```

### show pim neighbors detail

```

user@host> show pim neighbors detail
Instance: PIM.master
Interface: ge-0/0/1.0

Address: 10.10.1.1, IPv4, PIM v2, Mode: SparseDense, sg Join Count: 0, tsj
Join Count: 2
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 2053759302
Hello Option Bi-Directional PIM supported
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported

```

```

Address: 10.10.1.2, IPv4, PIM v2, sg Join Count: 0, tsg Join Count: 2
 BFD: Disabled
 Hello Option Holdtime: 105 seconds 93 remaining
 Hello Option DR Priority: 1
 Hello Option Generation ID: 1734018161
 Hello Option Bi-Directional PIM supported
 Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
 Join Suppression supported

```

Interface: lo0.0

```

Address: 10.255.179.246, IPv4, PIM v2, Mode: SparseDense, sg Join Count:
0, tsg Join Count: 0
 Hello Option Holdtime: 65535 seconds
 Hello Option DR Priority: 1
 Hello Option Generation ID: 1997462267
 Hello Option Bi-Directional PIM supported
 Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
 Join Suppression supported

```

#### show pim neighbors detail (With BFD)

```

user@host> show pim neighbors detail

```

```

Instance: PIM.master

```

```

Interface: fe-1/0/0.0

```

```

Address: 192.168.11.1, IPv4, PIM v2, Mode: Sparse
 Hello Option Holdtime: 65535 seconds
 Hello Option DR Priority: 1
 Hello Option Generation ID: 836607909
 Hello Option LAN Prune Delay: delay 500 ms override 2000 ms

```

```

Address: 192.168.11.2, IPv4, PIM v2
 BFD: Enabled, Operational state is up
 Hello Default Holdtime: 105 seconds 104 remaining
 Hello Option DR Priority: 1
 Hello Option Generation ID: 1907549685
 Hello Option LAN Prune Delay: delay 500 ms override 2000 ms

```

```

Interface: fe-1/0/1.0

```

```

Address: 192.168.12.1, IPv4, PIM v2
 BFD: Disabled
 Hello Default Holdtime: 105 seconds 80 remaining
 Hello Option DR Priority: 1
 Hello Option Generation ID: 1971554705
 Hello Option LAN Prune Delay: delay 500 ms override 2000 ms

```

## show pim rps

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1629</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1629</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                       | <pre>show pim rps &lt;brief   detail   extensive&gt; &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim rps &lt;brief   detail   extensive&gt; &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                                  | Display information about Protocol Independent Multicast (PIM) rendezvous points (RPs).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about PIM RPs for all groups and family addresses for all routing instances.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>group-address</b>—(Optional) Display the RPs for a particular group. If you specify a group address, the output lists the routing device that is the RP for that group.</p> <p><b>inet   inet6</b>—(Optional) Display information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance instance-name</b>—(Optional) Display information about RPs for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Bidirectional PIM</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show pim rps on page 1632</a><br><a href="#">show pim rps brief on page 1632</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

[show pim rps <group-address> on page 1632](#)  
[show pim rps <group-address> \(Bidirectional PIM\) on page 1632](#)  
[show pim rps <group-address> \(PIM Dense Mode\) on page 1633](#)  
[show pim rps <group-address> \(SSM Range Without asm-override-ssm Configured\) on page 1633](#)  
[show pim rps <group-address> \(SSM Range With asm-override-ssm Configured and a Sparse-Mode RP\) on page 1633](#)  
[show pim rps <group-address> \(SSM Range With asm-override-ssm Configured and a Bidirectional RP\) on page 1633](#)  
[show pim rps instance on page 1633](#)  
[show pim rps extensive \(PIM Sparse Mode\) on page 1633](#)  
[show pim rps extensive \(Bidirectional PIM\) on page 1634](#)  
[show pim rps extensive \(PIM Anycast RP in Use\) on page 1634](#)

**Output Fields** [Table 129 on page 1630](#) describes the output fields for the **show pim rps** command. Output fields are listed in the approximate order in which they appear.

**Table 129: show pim rps Output Fields**

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output         |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Instance</b>                 | Name of the routing instance.                                                                                                                                                                                                                                                                                                                                                                      | All levels              |
| <b>Family or Address family</b> | Name of the address family: <b>inet</b> (IPv4) or <b>inet6</b> (IPv6).                                                                                                                                                                                                                                                                                                                             | All levels              |
| <b>RP address</b>               | Address of the rendezvous point.                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Type</b>                     | Type of RP: <ul style="list-style-type: none"> <li>• <b>auto-rp</b>—Address of the RP known through the Auto-RP protocol.</li> <li>• <b>bootstrap</b>—Address of the RP known through the bootstrap router protocol (BSR).</li> <li>• <b>embedded</b>—Address of the RP known through an embedded RP (IPv6).</li> <li>• <b>static</b>—Address of RP known through static configuration.</li> </ul> | <b>brief none</b>       |
| <b>Holdtime</b>                 | How long to keep the RP active, with time remaining, in seconds.                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Timeout</b>                  | How long until the local routing device determines the RP to be unreachable, in seconds.                                                                                                                                                                                                                                                                                                           | All levels              |
| <b>Groups</b>                   | Number of groups currently using this RP.                                                                                                                                                                                                                                                                                                                                                          | All levels              |
| <b>Group prefixes</b>           | Addresses of groups that this RP can span.                                                                                                                                                                                                                                                                                                                                                         | <b>brief none</b>       |
| <b>Learned via</b>              | Address and method by which the RP was learned.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Mode</b>                     | The PIM mode of the RP: bidirectional or sparse.<br><br>If a sparse and bidirectional RPs are configured with the same RP address, they appear as separate entries in both formats.                                                                                                                                                                                                                | All levels              |



Table 129: show pim rps Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Time Active</b>            | How long the RP has been active, in the format <i>hh:mm:ss</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | detail extensive                             |
| <b>Device Index</b>           | Index value of the order in which Junos OS finds and initializes the interface.<br><br>For bidirectional RPs, the <b>Device Index</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | detail extensive                             |
| <b>Subunit</b>                | Logical unit number of the interface.<br><br>For bidirectional RPs, the <b>Subunit</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | detail extensive                             |
| <b>Interface</b>              | Either the encapsulation or the de-encapsulation logical interface, depending on whether this routing device is a designated router (DR) facing an RP router, or is the local RP, respectively.<br><br>For bidirectional RPs, the <b>Interface</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive                             |
| <b>Group Ranges</b>           | Addresses of groups that this RP spans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive<br><br><i>group-address</i> |
| <b>Active groups using RP</b> | Number of groups currently using this RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive                             |
| <b>total</b>                  | Total number of active groups for this RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | detail extensive                             |
| <b>Register State for RP</b>  | Current register state for each group: <ul style="list-style-type: none"> <li>• <b>Group</b>—Multicast group address.</li> <li>• <b>Source</b>—Multicast source address for which the PIM register is sent or received, depending on whether this router is a designated router facing an RP router, or is the local RP, respectively:</li> <li>• <b>First Hop</b>—PIM-designated routing device that sent the Register message (the source address in the IP header).</li> <li>• <b>RP Address</b>—RP to which the Register message was sent (the destination address in the IP header).</li> <li>• <b>State</b>: <ul style="list-style-type: none"> <li>On the designated router: <ul style="list-style-type: none"> <li>• <b>Send</b>—Sending Register messages.</li> <li>• <b>Probe</b>—Sent a null register. If a Register-Stop message does not arrive in 5 seconds, the designated router resumes sending Register messages.</li> <li>• <b>Suppress</b>—Received a Register-Stop message. The designated router is waiting for the timer to resume before changing to <b>Probe</b> state.</li> </ul> </li> <li>On the RP: <ul style="list-style-type: none"> <li>• <b>Receive</b>—Receiving Register messages.</li> </ul> </li> </ul> </li> </ul> | extensive                                    |
| <b>Anycast-PIM rpset</b>      | If anycast RP is configured, the addresses of the RPs in the set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | extensive                                    |

Table 129: show pim rps Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output      |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Anycast-PIM local address used | If anycast RP is configured, the local address used by the RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | extensive            |
| Anycast-PIM Register State     | <p>If anycast RP is configured, the current register state for each group:</p> <ul style="list-style-type: none"> <li>• <b>Group</b>—Multicast group address.</li> <li>• <b>Source</b>—Multicast source address for which the PIM register is sent or received, depending on whether this routing device is a designated router facing an RP router, or is the local RP, respectively.</li> <li>• <b>Origin</b>—How the information was obtained: <ul style="list-style-type: none"> <li>• <b>DIRECT</b>—From a local attachment</li> <li>• <b>MSDP</b>—From the Multicast Source Discovery Protocol (MSDP)</li> <li>• <b>DR</b>—From the designated router</li> </ul> </li> </ul> | extensive            |
| RP selected                    | For sparse mode and bidirectional mode, the identity of the RP for the specified group address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>group-address</i> |

## Sample Output

### show pim rps

```

user@host> show pim rps
Instance: PIM.master
Address family INET
RP address Type Mode Holdtime Timeout Groups Group prefixes
10.10.1.3 static bidir 150 None 2 224.1.3.0/24
 225.1.3.0/24
10.10.13.2 static bidir 150 None 2 224.1.1.0/24
 225.1.1.0/24

```

### show pim rps brief

The output for the **show pim rps brief** command is identical to that for the **show pim rps** command. For sample output, see [show pim rps on page 1632](#).

### show pim rps <group-address>

```

user@host> show pim rps 235.100.100.0
Instance: PIM.master
Instance: PIM.master

RP selected: 100.100.100.100

```

### show pim rps <group-address> (Bidirectional PIM)

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

224.1.0.0/16
 11.4.12.75 (Bidirectional)

RP selected: 11.4.12.75

```

**show pim rps <group-address> (PIM Dense Mode)**

```
user@host> show pim rps 224.1.1.1
Instance: PIM.master

Dense Mode active for group 224.1.1.1
```

**show pim rps <group-address> (SSM Range Without asm-override-ssm Configured)**

```
user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active for group 224.1.1.1
```

**show pim rps <group-address> (SSM Range With asm-override-ssm Configured and a Sparse-Mode RP)**

```
user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active with Sparse Mode ASM override for group 224.1.1.1

224.1.0.0/16
 11.4.12.75

RP selected: 11.4.12.75
```

**show pim rps <group-address> (SSM Range With asm-override-ssm Configured and a Bidirectional RP)**

```
user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active with Sparse Mode ASM override for group 224.1.1.1

224.1.0.0/16
 11.4.12.75 (Bidirectional)

RP selected: (null)
```

**show pim rps instance**

```
user@host> show pim rps instance VPN-A
Instance: PIM.VPN-A
Address family INET
RP address Type Holdtime Timeout Groups Group prefixes
10.10.47.100 static 0 None 1 224.0.0.0/4

Address family INET6
```

**show pim rps extensive (PIM Sparse Mode)**

```
user@host> show pim rps extensive
Instance: PIM.master

Family: INET
RP: 10.255.245.91
Learned via: static configuration
Time Active: 00:05:48
Holdtime: 45 with 36 remaining
Device Index: 122
Subunit: 32768
Interface: pd-6/0/0.32768
Group Ranges:
```

```
224.0.0.0/4, 36s remaining
Active groups using RP:
225.1.1.1
```

```
total 1 groups active
```

```
Register State for RP:
```

| Group     | Source         | FirstHop      | RP Address    | State   | Timeout |
|-----------|----------------|---------------|---------------|---------|---------|
| 225.1.1.1 | 192.168.195.78 | 10.255.14.132 | 10.255.245.91 | Receive | 0       |

#### show pim rps extensive (Bidirectional PIM)

```
user@host> show pim rps extensive
```

```
Instance: PIM.master
```

```
Address family INET
```

```
RP: 10.10.1.3
```

```
Learned via: static configuration
```

```
Mode: Bidirectional
```

```
Time Active: 01:58:07
```

```
Holdtime: 150
```

```
Group Ranges:
```

```
224.1.3.0/24
```

```
225.1.3.0/24
```

```
RP: 10.10.13.2
```

```
Learned via: static configuration
```

```
Mode: Bidirectional
```

```
Time Active: 01:58:07
```

```
Holdtime: 150
```

```
Group Ranges:
```

```
224.1.1.0/24
```

```
225.1.1.0/24
```

#### show pim rps extensive (PIM Anycast RP in Use)

```
user@host> show pim rps extensive
```

```
Instance: PIM.master
```

```
Family: INET
```

```
RP: 10.10.10.2
```

```
Learned via: static configuration
```

```
Time Active: 00:54:52
```

```
Holdtime: 0
```

```
Device Index: 130
```

```
Subunit: 32769
```

```
Interface: pimd.32769
```

```
Group Ranges:
```

```
224.0.0.0/4
```

```
Active groups using RP:
```

```
224.10.10.10
```

```
total 1 groups active
```

```
Anycast-PIM rpset:
```

```
10.100.111.34
```

```
10.100.111.17
```

```
10.100.111.55
```

```
Anycast-PIM local address used: 10.100.111.1
```

```
Anycast-PIM Register State:
```

| Group        | Source     | Origin |
|--------------|------------|--------|
| 224.1.1.1    | 10.10.95.2 | DIRECT |
| 224.1.1.2    | 10.10.95.2 | DIRECT |
| 224.10.10.10 | 10.10.70.1 | MSDP   |
| 224.10.10.11 | 10.10.70.1 | MSDP   |
| 224.20.20.1  | 10.10.71.1 | DR     |

Address family INET6

Anycast-PIM rpset:

ab::1

ab::2

Anycast-PIM local address used: cd::1

Anycast-PIM Register State:

| Group         | Source       | Origin |
|---------------|--------------|--------|
| ::224.1.1.1   | ::10.10.95.2 | DIRECT |
| ::224.1.1.2   | ::10.10.95.2 | DIRECT |
| ::224.20.20.1 | ::10.10.71.1 | DR     |

## show pim snooping interfaces

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show pim snooping interfaces<br><brief   detail><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><logical-system <i>logical-system-name</i> ><br><vlan-id <i>vlan-identifier</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.<br>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display information about PIM snooping interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—Display detailed information.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance &lt;instance-name&gt;</b>—(Optional) Display PIM snooping interface information for the specified routing instance.</p> <p><b>interface &lt;interface-name&gt;</b>—(Optional) Display PIM snooping information for the specified interface only.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>vlan-id &lt;vlan-identifier&gt;</b>—(Optional) Display PIM snooping interface information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>PIM Snooping for VPLS</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show pim snooping interfaces on page 1637</a><br><a href="#">show pim snooping interfaces instance vpls1 on page 1637</a><br><a href="#">show pim snooping interfaces interface &lt;interface-name&gt; on page 1638</a><br><a href="#">show pim snooping interfaces vlan-id &lt;vlan-id&gt; on page 1638</a>                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | <p><a href="#">Table 130 on page 1636</a> lists the output fields for the <b>show pim snooping interface</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 130: show pim snooping interface Output Fields

| Field Name      | Field Description                  | Level of Output |
|-----------------|------------------------------------|-----------------|
| Instance        | Routing instance for PIM snooping. | All levels      |
| Learning-Domain | Learning domain for snooping.      | All levels      |

Table 130: show pim snooping interface Output Fields (*continued*)

| Field Name        | Field Description                                                        | Level of Output |
|-------------------|--------------------------------------------------------------------------|-----------------|
| <b>Name</b>       | Router interfaces that are part of this learning domain.                 | All levels      |
| <b>State</b>      | State of the interface: <b>Up</b> , or <b>Down</b> .                     | All levels      |
| <b>IP-Version</b> | Version of IP used: 4 for IPv4, or 6 for IPv6.                           | All levels      |
| <b>NbrCnt</b>     | Number of neighboring routers connected through the specified interface. | All levels      |
| <b>DR address</b> | IP address of the designated router.                                     | All levels      |

## Sample Output

### show pim snooping interfaces

```

user@host> show pim snooping interfaces
Instance: vpls1
Learning-Domain: vlan-id 10
Name State IP-Version NbrCnt
ge-1/3/1.10 Up 4 1
ge-1/3/3.10 Up 4 1
ge-1/3/5.10 Up 4 1
ge-1/3/7.10 Up 4 1
DR address: 20.0.110.5
DR flooding is ON

Learning-Domain: vlan-id 20
Name State IP-Version NbrCnt
ge-1/3/1.20 Up 4 1
ge-1/3/3.20 Up 4 1
ge-1/3/5.20 Up 4 1
ge-1/3/7.20 Up 4 1
DR address: 20.0.120.5
DR flooding is ON

```

### show pim snooping interfaces instance vpls1

```

user@host> show pim snooping interfaces instance vpls1
Instance: vpls1

Learning-Domain: vlan-id 10
Name State IP-Version NbrCnt
ge-1/3/1.10 Up 4 1
ge-1/3/3.10 Up 4 1
ge-1/3/5.10 Up 4 1
ge-1/3/7.10 Up 4 1
DR address: 20.0.110.5
DR flooding is ON

Learning-Domain: vlan-id 20
Name State IP-Version NbrCnt
ge-1/3/1.20 Up 4 1
ge-1/3/3.20 Up 4 1
ge-1/3/5.20 Up 4 1
ge-1/3/7.20 Up 4 1

```

```
DR address: 20.0.120.5
DR flooding is ON
```

#### show pim snooping interfaces interface <interface-name>

```
user@host> show pim snooping interfaces interface ge-1/3/1.10
Instance: vpls1
Learning-Domain: vlan-id 10

Name State IP-Version NbrCnt
ge-1/3/1.10 Up 4 1
DR address: 20.0.110.5
DR flooding is ON

Learning-Domain: vlan-id 20
DR address: 20.0.120.5
DR flooding is ON
```

#### show pim snooping interfaces vlan-id <vlan-id>

```
user@host> show pim snooping interfaces vlan-id 10
Instance: vpls1
Learning-Domain: vlan-id 10

Name State IP-Version NbrCnt
ge-1/3/1.10 Up 4 1
ge-1/3/3.10 Up 4 1
ge-1/3/5.10 Up 4 1
ge-1/3/7.10 Up 4 1
DR address: 20.0.110.5
DR flooding is ON
```



## show pim snooping join

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show pim snooping join<br><brief   detail   extensive><br><instance <i>instance-name</i> ><br><logical-system <i>logical-system-name</i> ><br><vlan-id <i>vlan-id</i> >                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.<br>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display information about Protocol Independent Multicast (PIM) snooping joins.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>none</b>—Display detailed information.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display PIM snooping join information for the specified routing instance.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display PIM snooping join information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>PIM Snooping for VPLS</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show pim snooping join on page 1641</a><br><a href="#">show pim snooping join extensive on page 1641</a><br><a href="#">show pim snooping join instance on page 1641</a><br><a href="#">show pim snooping join vlan-id on page 1642</a>                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 131 on page 1639 lists the output fields for the <b>show pim snooping join</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                       |

**Table 131: show pim snooping join Output Fields**

| Field Name      | Field Description                  | Level of Output |
|-----------------|------------------------------------|-----------------|
| Instance        | Routing instance for PIM snooping. | All levels      |
| Learning-Domain | Learning domain for PIM snooping.  | All levels      |
| Group           | Multicast group address.           | All levels      |

Table 131: show pim snooping join Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Source               | Multicast source address: <ul style="list-style-type: none"> <li>• * (wildcard value)</li> <li>• &lt;ipv4-address&gt;</li> <li>• &lt;ipv6-address&gt;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels       |
| Flags                | PIM flags: <ul style="list-style-type: none"> <li>• <b>bidirectional</b>—Bidirectional mode entry.</li> <li>• <b>dense</b>—Dense mode entry.</li> <li>• <b>rptree</b>—Entry is on the rendezvous point tree.</li> <li>• <b>sparse</b>—Sparse mode entry.</li> <li>• <b>spt</b>—Entry is on the shortest-path tree for the source.</li> <li>• <b>wildcard</b>—Entry is on the shared tree.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels       |
| Upstream state       | Information about the upstream interface: <ul style="list-style-type: none"> <li>• <b>Join to RP</b>—Sending a join to the rendezvous point.</li> <li>• <b>Join to Source</b>—Sending a join to the source.</li> <li>• <b>Local RP</b>—Sending neither join messages nor prune messages toward the RP, because this router is the rendezvous point.</li> <li>• <b>Local Source</b>—Sending neither join messages nor prune messages toward the source, because the source is locally attached to this routing device.</li> <li>• <b>Prune to RP</b>—Sending a prune to the rendezvous point.</li> <li>• <b>Prune to Source</b>—Sending a prune to the source.</li> </ul> <p><b>NOTE:</b> RP group range entries have <b>None</b> in the <b>Upstream state</b> field because RP group ranges do not trigger actual PIM join messages between routers.</p> | All levels       |
| Upstream neighbor    | Information about the upstream neighbor: <b>Direct</b> , <b>Local</b> , <b>Unknown</b> , or a specific IP address.<br><br>For bidirectional PIM, <b>Direct</b> means that the interface is directly connected to a subnet that contains a phantom RP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels       |
| Upstream port        | RPF interface toward the source address for the source-specific state (S,G) or toward the rendezvous point (RP) address for the non-source-specific state (*G).<br><br>For bidirectional PIM, <b>RP Link</b> means that the interface is directly connected to a subnet that contains a phantom RP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels       |
| Downstream port      | Information about downstream interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b> |
| Downstream neighbors | Address of the downstream neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| Timeout              | Time remaining until the downstream join state is updated (in seconds).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>extensive</b> |

## Sample Output

### show pim snooping join

```

user@host> show pim snooping join
Instance: vpls1

Learning-Domain: vlan-id 10
Group: 225.1.1.2
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.110.4, port: ge-1/3/5.10

Learning-Domain: vlan-id 20
Group: 225.1.1.3
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.120.4, port: ge-1/3/5.20

```

### show pim snooping join extensive

```

user@host> show pim snooping join extensive
Instance: vpls1
Learning-Domain: vlan-id 10

Group: 225.1.1.2
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.110.4, port: ge-1/3/5.10
Downstream port: ge-1/3/1.10
Downstream neighbors:
20.0.110.2 State: Join Flags: SRW Timeout: 166

Learning-Domain: vlan-id 20
Group: 225.1.1.3
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.120.4, port: ge-1/3/5.20
Downstream port: ge-1/3/3.20
Downstream neighbors:
20.0.120.3 State: Join Flags: SRW Timeout: 168

```

### show pim snooping join instance

```

user@host> show pim snooping join instance vpls1
Instance: vpls1

Learning-Domain: vlan-id 10
Group: 225.1.1.2
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.110.4, port: ge-1/3/5.10

Learning-Domain: vlan-id 20
Group: 225.1.1.3

```

Source: \*  
Flags: sparse,rptree,wildcard  
Upstream state: None  
Upstream neighbor: 20.0.120.4, port: ge-1/3/5.20

#### show pim snooping join vlan-id

```
user@host> show pim snooping join vlan-id 10
Instance: vpls1
Learning-Domain: vlan-id 10
Group: 225.1.1.2
Source: *
Flags: sparse,rptree,wildcard
Upstream state: None
Upstream neighbor: 20.0.110.4, port: ge-1/3/5.10
```

## show pim snooping neighbors

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show pim snooping neighbors &lt;brief   detail&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system <i>logical-system-name</i>&gt; &lt;vlan-id <i>vlan-identifier</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.</p> <p>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display information about Protocol Independent Multicast (PIM) snooping neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Display detailed information.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display PIM snooping neighbor information for the specified routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display information for the specified PIM snooping neighbor interface.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display PIM snooping neighbor information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Interface Priority for PIM Designated Router Selection</i></li> <li>• <i>Modifying the PIM Hello Interval</i></li> <li>• <i>PIM Snooping for VPLS</i></li> <li>• <a href="#">show pim neighbors on page 1625</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <p><a href="#">show pim snooping neighbors on page 1644</a></p> <p><a href="#">show pim snooping neighbors detail on page 1645</a></p> <p><a href="#">show pim snooping neighbors instance on page 1646</a></p> <p><a href="#">show pim snooping neighbors interface on page 1646</a></p> <p><a href="#">show pim snooping neighbors vlan-id on page 1647</a></p>                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | <p><a href="#">Table 132 on page 1644</a> lists the output fields for the <b>show pim snooping neighbors</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 132: show pim snooping neighbors Output Fields

| Field Name                          | Field Description                                                                                                                                                                                                                                                                             | Level of Output |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Instance</b>                     | Routing instance for PIM snooping.                                                                                                                                                                                                                                                            | All levels      |
| <b>Learning-Domain</b>              | Learning domain for PIM snooping.                                                                                                                                                                                                                                                             | All levels      |
| <b>Interface</b>                    | Router interface for which PIM snooping neighbor details are displayed.                                                                                                                                                                                                                       | All levels      |
| <b>Option</b>                       | PIM snooping options available on the specified interface: <ul style="list-style-type: none"> <li>• H = Hello Option Holdtime</li> <li>• P = Hello Option DR Priority</li> <li>• L = Hello Option LAN Prune Delay</li> <li>• G = Generation Identifier</li> <li>• T = Tracking Bit</li> </ul> | All levels      |
| <b>Uptime</b>                       | Time the neighbor has been operational since the PIM process was last initialized, in the format <b>dd:hh:mm:ss ago</b> for less than a week and <b>nwnd:hh:mm:ss ago</b> for more than a week.                                                                                               | All levels      |
| <b>Neighbor addr</b>                | IP address of the PIM snooping neighbor connected through the specified interface.                                                                                                                                                                                                            | All levels      |
| <b>Address</b>                      | IP address of the specified router interface.                                                                                                                                                                                                                                                 | All levels      |
| <b>Hello Option Holdtime</b>        | Time for which the neighbor is available, in seconds. The range of values is <b>0</b> through <b>65,535</b> .                                                                                                                                                                                 | <b>detail</b>   |
| <b>Hello Option DR Priority</b>     | Designated router election priority. The range of values is <b>0</b> through <b>4294967295</b> .<br><br><b>NOTE:</b> By default, every PIM interface has an equal probability (priority 1) of being selected as the DR.                                                                       | <b>detail</b>   |
| <b>Hello Option Generation ID</b>   | 9-digit or 10-digit number used to tag hello messages.                                                                                                                                                                                                                                        | <b>detail</b>   |
| <b>Hello Option LAN Prune Delay</b> | Time to wait before the neighbor receives prune messages, in the format <b>delay nnn ms override nnnn ms</b> .                                                                                                                                                                                | <b>detail</b>   |

## Sample Output

### show pim snooping neighbors

```

user@host> show pim snooping neighbors
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking Bit

Instance: vpls1
Learning-Domain: vlan-id 10

Interface Option Uptime Neighbor addr
ge-1/3/1.10 HPLGT 00:43:33 20.0.110.2

```

```

ge-1/3/3.10 HPLGT 00:43:33 20.0.110.3
ge-1/3/5.10 HPLGT 00:43:33 20.0.110.4
ge-1/3/7.10 HPLGT 00:43:33 20.0.110.5

```

```
Learning-Domain: vlan-id 20
```

```

Interface Option Uptime Neighbor addr
ge-1/3/1.20 HPLGT 00:43:33 20.0.120.2
ge-1/3/3.20 HPLGT 00:43:33 20.0.120.3
ge-1/3/5.20 HPLGT 00:43:33 20.0.120.4
ge-1/3/7.20 HPLGT 00:43:33 20.0.120.5

```

### show pim snooping neighbors detail

```

user@host> show pim snooping neighbors detail
Instance: vpls1
Learning-Domain: vlan-id 10

Interface: ge-1/3/1.10
Address: 20.0.110.2
Uptime: 00:44:51
Hello Option Holdtime: 105 seconds 83 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 830908833
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Tracking is supported

Interface: ge-1/3/3.10
Address: 20.0.110.3
Uptime: 00:44:51
Hello Option Holdtime: 105 seconds 97 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 2056520742
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Tracking is supported

Interface: ge-1/3/5.10
Address: 20.0.110.4
Uptime: 00:44:51
Hello Option Holdtime: 105 seconds 81 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1152066227
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Tracking is supported

Interface: ge-1/3/7.10
Address: 20.0.110.5
Uptime: 00:44:51
Hello Option Holdtime: 105 seconds 96 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1113200338
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Tracking is supported
Learning-Domain: vlan-id 20

Interface: ge-1/3/1.20
Address: 20.0.120.2
Uptime: 00:44:51
Hello Option Holdtime: 105 seconds 81 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 963205167

```

Hello Option LAN Prune Delay: delay 500 ms override 2000 ms  
Tracking is supported

Interface: ge-1/3/3.20  
Address: 20.0.120.3  
Uptime: 00:44:51  
Hello Option Holdtime: 105 seconds 104 remaining  
Hello Option DR Priority: 1  
Hello Option Generation ID: 166921538  
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms  
Tracking is supported

Interface: ge-1/3/5.20  
Address: 20.0.120.4  
Uptime: 00:44:51  
Hello Option Holdtime: 105 seconds 88 remaining  
Hello Option DR Priority: 1  
Hello Option Generation ID: 789422835  
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms  
Tracking is supported

Interface: ge-1/3/7.20  
Address: 20.0.120.5  
Uptime: 00:44:51  
Hello Option Holdtime: 105 seconds 88 remaining  
Hello Option DR Priority: 1  
Hello Option Generation ID: 1563649680  
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms  
Tracking is supported

### show pim snooping neighbors instance

```
user@host> show pim snooping neighbors instance vpls1
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking Bit
```

Instance: vpls1  
Learning-Domain: vlan-id 10

| Interface   | Option | Uptime   | Neighbor   | addr |
|-------------|--------|----------|------------|------|
| ge-1/3/1.10 | HPLGT  | 00:46:03 | 20.0.110.2 |      |
| ge-1/3/3.10 | HPLGT  | 00:46:03 | 20.0.110.3 |      |
| ge-1/3/5.10 | HPLGT  | 00:46:03 | 20.0.110.4 |      |
| ge-1/3/7.10 | HPLGT  | 00:46:03 | 20.0.110.5 |      |

Learning-Domain: vlan-id 20

| Interface   | Option | Uptime   | Neighbor   | addr |
|-------------|--------|----------|------------|------|
| ge-1/3/1.20 | HPLGT  | 00:46:03 | 20.0.120.2 |      |
| ge-1/3/3.20 | HPLGT  | 00:46:03 | 20.0.120.3 |      |
| ge-1/3/5.20 | HPLGT  | 00:46:03 | 20.0.120.4 |      |
| ge-1/3/7.20 | HPLGT  | 00:46:03 | 20.0.120.5 |      |

### show pim snooping neighbors interface

```
user@host> show pim snooping neighbors interface ge-1/3/1.20
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking Bit
```



```
Instance: vpls1
Learning-Domain: vlan-id 10
Learning-Domain: vlan-id 20

Interface Option Uptime Neighbor addr
ge-1/3/1.20 HPLGT 00:48:04 20.0.120.2
```

#### show pim snooping neighbors vlan-id

```
user@host> show pim snooping neighbors vlan-id 10
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking Bit

Instance: vpls1
Learning-Domain: vlan-id 10

Interface Option Uptime Neighbor addr
ge-1/3/1.10 HPLGT 00:49:12 20.0.110.2
ge-1/3/3.10 HPLGT 00:49:12 20.0.110.3
ge-1/3/5.10 HPLGT 00:49:12 20.0.110.4
ge-1/3/7.10 HPLGT 00:49:12 20.0.110.5
```

## show pim snooping statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show pim snooping statistics<br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><logical-system <i>logical-system-name</i> ><br><vlan-id <i>vlan-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3 for MX Series 3D Universal Edge devices.<br>Command introduced in Junos OS Release 13.2 for M Series Multiservice Edge devices.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Display Protocol Independent Multicast (PIM) snooping statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><b>none</b>—Display PIM statistics.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display statistics for a specific routing instance enabled by Protocol Independent Multicast (PIM) snooping.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display statistics about the specified interface for PIM snooping.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>vlan-id <i>vlan-identifier</i></b>—(Optional) Display PIM snooping statistics information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>PIM Snooping for VPLS</i></li> <li>• <a href="#">clear pim snooping statistics on page 1478</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show pim snooping statistics on page 1649</a><br><a href="#">show pim snooping statistics instance on page 1650</a><br><a href="#">show pim snooping statistics interface on page 1651</a><br><a href="#">show pim snooping statistics vlan-id on page 1651</a>                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>            | <p><a href="#">Table 133 on page 1648</a> lists the output fields for the <b>show pim snooping statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 133: show pim snooping statistics Output Fields

| Field Name      | Field Description                               | Level of Output |
|-----------------|-------------------------------------------------|-----------------|
| Instance        | Routing instance for PIM snooping.              | All levels      |
| Learning-Domain | Learning domain for PIM snooping.               | All levels      |
| Tx J/P messages | Total number of transmitted join/prune packets. | All levels      |

Table 133: show pim snooping statistics Output Fields (*continued*)

| Field Name                          | Field Description                                                                 | Level of Output |
|-------------------------------------|-----------------------------------------------------------------------------------|-----------------|
| <b>Rx J/P messages</b>              | Total number of received join/prune packets.                                      | All levels      |
| <b>Rx J/P messages -- seen</b>      | Number of join/prune packets seen but not received on the upstream interface.     | All levels      |
| <b>Rx J/P messages -- received</b>  | Number of join/prune packets received on the downstream interface.                | All levels      |
| <b>Rx Hello messages</b>            | Total number of received hello packets.                                           | All levels      |
| <b>Rx Version Unknown</b>           | Number of packets received with an unknown version number.                        | All levels      |
| <b>Rx Neighbor Unknown</b>          | Number of packets received from an unknown neighbor.                              | All levels      |
| <b>Rx Upstream Neighbor Unknown</b> | Number of packets received with unknown upstream neighbor information.            | All levels      |
| <b>Rx Bad Length</b>                | Number of packets received containing incorrect length information.               | All levels      |
| <b>Rx J/P Busy Drop</b>             | Number of join/prune packets dropped while the router is busy.                    | All levels      |
| <b>Rx J/P Group Aggregate 0</b>     | Number of join/prune packets received containing the aggregate group information. | All levels      |
| <b>Rx Malformed Packet</b>          | Number of malformed packets received.                                             | All levels      |
| <b>Rx No PIM Interface</b>          | Number of packets received without the interface information.                     | All levels      |
| <b>Rx No Upstream Neighbor</b>      | Number of packets received without upstream neighbor information.                 | All levels      |
| <b>Rx Unknown Hello Option</b>      | Number of hello packets received with unknown options.                            | All levels      |

## Sample Output

### show pim snooping statistics

```

user@host> show pim snooping statistics
Instance: vpls1
Learning-Domain: vlan-id 10

Tx J/P messages 0
Rx J/P messages 8
Rx J/P messages -- seen 0
Rx J/P messages -- received 8
Rx Hello messages 37

```

```

Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
Rx No PIM Interface 0
Rx No Upstream Neighbor 0
Rx Bad Length 0
Rx Neighbor Unknown 0
Rx Unknown Hello Option 0
Rx Malformed Packet 0

```

Learning-Domain: vlan-id 20

```

Tx J/P messages 0
RX J/P messages 2
Rx J/P messages -- seen 0
Rx J/P messages -- received 2
Rx Hello messages 39
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
Rx No PIM Interface 0
Rx No Upstream Neighbor 0
Rx Bad Length 0
Rx Neighbor Unknown 0
Rx Unknown Hello Option 0
Rx Malformed Packet 0

```

### show pim snooping statistics instance

```

user@host> show pim snooping statistics instance vpls1
Instance: vpls1
Learning-Domain: vlan-id 10

```

```

Tx J/P messages 0
RX J/P messages 9
Rx J/P messages -- seen 0
Rx J/P messages -- received 9
Rx Hello messages 45
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
Rx No PIM Interface 0
Rx No Upstream Neighbor 0
Rx Bad Length 0
Rx Neighbor Unknown 0
Rx Unknown Hello Option 0
Rx Malformed Packet 0

```

```

Learning-Domain: vlan-id 20

Tx J/P messages 0
RX J/P messages 3
Rx J/P messages -- seen 0
Rx J/P messages -- received 3
Rx Hello messages 47
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0
Rx No PIM Interface 0
Rx No Upstream Neighbor 0
Rx Bad Length 0
Rx Neighbor Unknown 0
Rx Unknown Hello Option 0
Rx Malformed Packet 0

```

#### show pim snooping statistics interface

```

user@host> show pim snooping statistics interface ge-1/3/1.20
Instance: vpls1
Learning-Domain: vlan-id 10
Learning-Domain: vlan-id 20

PIM Interface statistics for ge-1/3/1.20
Tx J/P messages 0
RX J/P messages 0
Rx J/P messages -- seen 0
Rx J/P messages -- received 0
Rx Hello messages 13
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0

```

#### show pim snooping statistics vlan-id

```

user@host> show pim snooping statistics vlan-id 10
Instance: vpls1
Learning-Domain: vlan-id 10

Tx J/P messages 0
RX J/P messages 11
Rx J/P messages -- seen 0
Rx J/P messages -- received 11
Rx Hello messages 64
Rx Version Unknown 0
Rx Neighbor Unknown 0
Rx Upstream Neighbor Unknown 0
Rx Bad Length 0
Rx J/P Busy Drop 0
Rx J/P Group Aggregate 0
Rx Malformed Packet 0

```

Rx No PIM Interface 0  
Rx No Upstream Neighbor 0  
Rx Bad Length 0  
Rx Neighbor Unknown 0

## show pim source

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1653</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1653</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax</b>                                       | <pre>show pim source &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim source &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                                  | Display information about the Protocol Independent Multicast (PIM) source reverse path forwarding (RPF) state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about the PIM RPF state for all supported family addresses for all routing instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the RPF state for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>source-prefix</b>—(Optional) Display the state for source RPF states in the given range.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>                        | <a href="#">show pim source on page 1654</a><br><a href="#">show pim source brief on page 1654</a><br><a href="#">show pim source detail on page 1654</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                                | <p><a href="#">Table 134 on page 1654</a> describes the output fields for the <b>show pim source</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 134: show pim source Output Fields

| Field Name         | Field Description                                                     |
|--------------------|-----------------------------------------------------------------------|
| Instance           | Name of the routing instance.                                         |
| Source             | Address of the source or reverse path.                                |
| Prefix/length      | Prefix and prefix length for the route used to reach the RPF address. |
| Upstream interface | RPF interface toward the source address.                              |
| Upstream Neighbor  | Address of the RPF neighbor used to reach the source address.         |

## Sample Output

### show pim source

```
user@host> show pim source
Instance: PIM.master Family: INET

Source 10.255.14.144
 Prefix 10.255.14.144/32
 Upstream interface Local
 Upstream neighbor Local

Source 10.255.70.15
 Prefix 10.255.70.15/32
 Upstream interface so-1/0/0.0
 Upstream neighbor 10.111.10.2

Instance: PIM.master Family: INET6
```

### show pim source brief

The output for the **show pim source brief** command is identical to that for the **show pim source** command. For sample output, see [show pim source on page 1654](#).

### show pim source detail

```
user@host> show pim source detail
Instance: PIM.master Family: INET

Source 10.255.14.144
 Prefix 10.255.14.144/32
 Upstream interface Local
 Upstream neighbor Local
 Active groups:228.0.0.0
 239.1.1.1
 239.1.1.1

Source 10.255.70.15
 Prefix 10.255.70.15/32
 Upstream interface so-1/0/0.0
 Upstream neighbor 10.111.10.2
 Active groups:239.1.1.1
```



Instance: PIM.master Family: INET6

## show pim statistics

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 1656</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 1656</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                                       | <pre>show pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Support for bidirectional PIM added in Junos OS Release 12.1.                                                                                                                                                                                                     |
| <b>Description</b>                                  | Display Protocol Independent Multicast (PIM) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display PIM statistics.</p> <p><b>inet   inet6</b>—(Optional) Display IPv4 or IPv6 PIM statistics, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display statistics for a specific routing instance enabled by Protocol Independent Multicast (PIM).</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display statistics about the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">clear pim statistics on page 1480</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>                        | <a href="#">show pim statistics on page 1662</a><br><a href="#">show pim statistics inet interface &lt;interface-name&gt; on page 1663</a><br><a href="#">show pim statistics inet6 interface &lt;interface-name&gt; on page 1664</a><br><a href="#">show pim statistics interface &lt;interface-name&gt; on page 1664</a>                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                                | <a href="#">Table 135 on page 1657</a> describes the output fields for the <b>show pim statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                |

Table 135: show pim statistics Output Fields

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>         | <p>Name of the routing instance.</p> <p>This field only appears if you specify an interface, for example:</p> <ul style="list-style-type: none"> <li>• <b>inet interface <i>interface-name</i></b></li> <li>• <b>inet6 interface <i>interface-name</i></b></li> <li>• <b>interface <i>interface-name</i></b></li> </ul>                                                                                                 |
| <b>Family</b>           | <p>Output is for IPv4 or IPv6 PIM statistics. <b>INET</b> indicates IPv4 statistics, and <b>INET6</b> indicates IPv6 statistics.</p> <p>This field only appears if you specify an interface, for example:</p> <ul style="list-style-type: none"> <li>• <b>inet interface <i>interface-name</i></b></li> <li>• <b>inet6 interface <i>interface-name</i></b></li> <li>• <b>interface <i>interface-name</i></b></li> </ul> |
| <b>PIM statistics</b>   | PIM statistics for all interfaces or for the specified interface.                                                                                                                                                                                                                                                                                                                                                       |
| <b>PIM message type</b> | Message type for which statistics are displayed.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Received</b>         | Number of received statistics.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Sent</b>             | Number of messages sent of a certain type.                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Rx errors</b>        | Number of received packets that contained errors.                                                                                                                                                                                                                                                                                                                                                                       |
| <b>V2 Hello</b>         | PIM version 2 hello packets.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>V2 Register</b>      | PIM version 2 register packets.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>V2 Register Stop</b> | PIM version 2 register stop packets.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>V2 Join Prune</b>    | PIM version 2 join and prune packets.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>V2 Bootstrap</b>     | PIM version 2 bootstrap packets.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>V2 Assert</b>        | PIM version 2 assert packets.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>V2 Graft</b>         | PIM version 2 graft packets.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>V2 Graft Ack</b>     | PIM version 2 graft acknowledgment packets.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>V2 Candidate RP</b>  | PIM version 2 candidate RP packets.                                                                                                                                                                                                                                                                                                                                                                                     |

Table 135: show pim statistics Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                              |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>V2 State Refresh</b>                 | PIM version 2 control messages related to PIM dense mode (PIM-DM) state refresh.<br><br>State refresh is an extension to PIM-DM. It not supported in Junos OS. |
| <b>V2 DF Election</b>                   | PIM version 2 send and receive messages associated with bidirectional PIM designated forwarder election.                                                       |
| <b>V1 Query</b>                         | PIM version 1 query packets.                                                                                                                                   |
| <b>V1 Register</b>                      | PIM version 1 register packets.                                                                                                                                |
| <b>V1 Register Stop</b>                 | PIM version 1 register stop packets.                                                                                                                           |
| <b>V1 Join Prune</b>                    | PIM version 1 join and prune packets.                                                                                                                          |
| <b>V1 RP Reachability</b>               | PIM version 1 RP reachability packets.                                                                                                                         |
| <b>V1 Assert</b>                        | PIM version 1 assert packets.                                                                                                                                  |
| <b>V1 Graft</b>                         | PIM version 1 graft packets.                                                                                                                                   |
| <b>V1 Graft Ack</b>                     | PIM version 1 graft acknowledgment packets.                                                                                                                    |
| <b>AutoRP Announce</b>                  | Auto-RP announce packets.                                                                                                                                      |
| <b>AutoRP Mapping</b>                   | Auto-RP mapping packets.                                                                                                                                       |
| <b>AutoRP Unknown type</b>              | Auto-RP packets with an unknown type.                                                                                                                          |
| <b>Anycast Register</b>                 | Auto-RP announce packets.                                                                                                                                      |
| <b>Anycast Register Stop</b>            | Auto-RP announce packets.                                                                                                                                      |
| <b>Global Statistics</b>                | Summary of PIM statistics for all interfaces.                                                                                                                  |
| <b>Hello dropped on neighbor policy</b> | Number of hello packets dropped because of a configured neighbor policy.                                                                                       |
| <b>Unknown type</b>                     | Number of PIM control packets received with an unknown type.                                                                                                   |
| <b>V1 Unknown type</b>                  | Number of PIM version 1 control packets received with an unknown type.                                                                                         |
| <b>Unknown Version</b>                  | Number of PIM control packets received with an unknown version. The version is not version 1 or version 2.                                                     |

Table 135: show pim statistics Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Neighbor unknown</b>                | Number of PIM control packets received (excluding PIM hello) without first receiving the hello packet.                    |
| <b>Bad Length</b>                      | Number of PIM control packets received for which the packet size does not match the PIM length field in the packet.       |
| <b>Bad Checksum</b>                    | Number of PIM control packets received for which the calculated checksum does not match the checksum field in the packet. |
| <b>Bad Receive If</b>                  | Number of PIM control packets received on an interface that does not have PIM configured.                                 |
| <b>Rx Bad Data</b>                     | Number of PIM control packets received that contain data for TCP Bad register packets.                                    |
| <b>Rx Intf disabled</b>                | Number of PIM control packets received on an interface that has PIM disabled.                                             |
| <b>Rx V1 Require V2</b>                | Number of PIM version 1 control packets received on an interface configured for PIM version 2.                            |
| <b>Rx V2 Require V1</b>                | Number of PIM version 2 control packets received on an interface configured for PIM version 1.                            |
| <b>Rx Register not RP</b>              | Number of PIM register packets received when the router is not the RP for the group.                                      |
| <b>Rx Register no route</b>            | Number of PIM register packets received when the RP does not have a unicast route back to the source.                     |
| <b>Rx Register no decap if</b>         | Number of PIM register packets received when the RP does not have a de-encapsulation interface.                           |
| <b>Null Register Timeout</b>           | Number of NULL register timeout packets.                                                                                  |
| <b>RP Filtered Source</b>              | Number of PIM packets received when the router has a source address filter configured for the RP.                         |
| <b>Rx Unknown Reg Stop</b>             | Number of register stop messages received with an unknown type.                                                           |
| <b>Rx Join/Prune no state</b>          | Number of join and prune messages received for which the router has no state.                                             |
| <b>Rx Join/Prune on upstream if</b>    | Number of join and prune messages received on the interface used to reach the upstream router, toward the RP.             |
| <b>Rx Join/Prune for invalid group</b> | Number of join or prune messages received for invalid multicast group addresses.                                          |

Table 135: show pim statistics Output Fields (*continued*)

| Field Name                            | Field Description                                                                                                                                           |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rx Join/Prune messages dropped</b> | Number of join and prune messages received and dropped.                                                                                                     |
| <b>Rx sparse join for dense group</b> | Number of PIM sparse mode join messages received for a group that is configured for dense mode.                                                             |
| <b>Rx Graft/Graft Ack no state</b>    | Number of graft and graft acknowledgment messages received for which the router or switch has no state.                                                     |
| <b>Rx Graft on upstream if</b>        | Number of graft messages received on the interface used to reach the upstream router, toward the RP.                                                        |
| <b>Rx CRP not BSR</b>                 | Number of BSR messages received in which the PIM message type is Candidate-RP-Advertisement, not Bootstrap.                                                 |
| <b>Rx BSR when BSR</b>                | Number of BSR messages received in which the PIM message type is Bootstrap.                                                                                 |
| <b>Rx BSR not RPF if</b>              | Number of BSR messages received on an interface that is not the RPF interface.                                                                              |
| <b>Rx unknown hello opt</b>           | Number of PIM hello packets received with options that Junos OS does not support.                                                                           |
| <b>Rx data no state</b>               | Number of PIM control packets received for which the router has no state for the data type.                                                                 |
| <b>Rx RP no state</b>                 | Number of PIM control packets received for which the router has no state for the RP.                                                                        |
| <b>Rx aggregate</b>                   | Number of PIM aggregate MDT packets received.                                                                                                               |
| <b>Rx malformed packet</b>            | Number of PIM control packets received with a malformed IP unicast or multicast address family.                                                             |
| <b>No RP</b>                          | Number of PIM control packets received with no RP address.                                                                                                  |
| <b>No register encap if</b>           | Number of PIM register packets received when the first-hop router does not have an encapsulation interface.                                                 |
| <b>No route upstream</b>              | Number of PIM control packets received when the router does not have a unicast route to the the interface used to reach the upstream router, toward the RP. |
| <b>Nexthop Unusable</b>               | Number of PIM control packets with an unusable nexthop. A path can be unusable if the route is hidden or the link is down.                                  |
| <b>RP mismatch</b>                    | Number of PIM control packets received for which the router has an RP mismatch.                                                                             |

Table 135: show pim statistics Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RP mode mismatch</b>                    | RP mode (sparse or bidirectional) mismatches encountered when processing join and prune messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>RPF neighbor unknown</b>                | Number of PIM control packets received for which the router has an unknown RPF neighbor for the source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Rx Joins/Prunes filtered</b>            | The number of join and prune messages filtered because of configured route filters and source address filters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Tx Joins/Prunes filtered</b>            | The number of join and prune messages filtered because of configured route filters and source address filters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Embedded-RP invalid addr</b>            | Number of packets received with an invalid embedded RP address in PIM join messages and other types of messages sent between routing domains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Embedded-RP limit exceed</b>            | Number of times the limit configured with the <b>maximum-rps</b> statement is exceeded. The <b>maximum-rps</b> statement limits the number of embedded RPs created in a specific routing instance. The range is from 1 through 500. The default is 100.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Embedded-RP added</b>                   | <p>Number of packets in which the embedded RP for IPv6 is added.</p> <p>The following receive events trigger extraction of an IPv6 embedded RP address on the router:</p> <ul style="list-style-type: none"> <li>• Multicast Listener Discovery (MLD) report for an embedded RP multicast group address</li> <li>• PIM join message with an embedded RP multicast group address</li> <li>• Static embedded RP multicast group address associated with an interface</li> <li>• Packets sent to an embedded RP multicast group address received on the DR</li> </ul> <p>An embedded RP node discovered through these receive events is added if it does not already exist on the routing platform.</p> |
| <b>Embedded-RP removed</b>                 | Number of packets in which the embedded RP for IPv6 is removed. The embedded RP is removed whenever all PIM join states using this RP are removed or the configuration changes to remove the embedded RP feature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Rx Register msgs filtering drop</b>     | Number of received register messages dropped because of a filter configured for PIM register messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Tx Register msgs filtering drop</b>     | Number of register messages dropped because of a filter configured for PIM register messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Rx Bidir Join/Prune on non-Bidir if</b> | Error counter for join and prune messages received on non-bidirectional PIM interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 135: show pim statistics Output Fields (*continued*)

| Field Name                              | Field Description                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Rx Bidir Join/Prune on non-DF if</b> | Error counter for join and prune messages received on non-designated forwarder interfaces. |

## Sample Output

### show pim statistics

```

user@host> show pim statistics
PIM Message type Received Sent Rx errors
V2 Hello 15 32 0
V2 Register 0 362 0
V2 Register Stop 483 0 0
V2 Join Prune 18 518 0
V2 Bootstrap 0 0 0
V2 Assert 0 0 0
V2 Graft 0 0 0
V2 Graft Ack 0 0 0
V2 Candidate RP 0 0 0
V2 State Refresh 0 0 0
V2 DF Election 0 0 0
V1 Query 0 0 0
V1 Register 0 0 0
V1 Register Stop 0 0 0
V1 Join Prune 0 0 0
V1 RP Reachability 0 0 0
V1 Assert 0 0 0
V1 Graft 0 0 0
V1 Graft Ack 0 0 0
AutoRP Announce 0 0 0
AutoRP Mapping 0 0 0
AutoRP Unknown type 0 0 0
Anycast Register 0 0 0
Anycast Register Stop 0 0 0

```

#### Global Statistics

```

Hello dropped on neighbor policy 0
Unknown type 0
V1 Unknown type 0
Unknown Version 0
Neighbor unknown 0
Bad Length 0
Bad Checksum 0
Bad Receive If 0
Rx Bad Data 0
Rx Intf disabled 0
Rx V1 Require V2 0
Rx V2 Require V1 0
Rx Register not RP 0
Rx Register no route 0
Rx Register no decap if 0
Null Register Timeout 0
RP Filtered Source 0
Rx Unknown Reg Stop 0
Rx Join/Prune no state 0

```



|                                     |   |
|-------------------------------------|---|
| Rx Join/Prune on upstream if        | 0 |
| Rx Join/Prune for invalid group     | 5 |
| Rx Join/Prune messages dropped      | 0 |
| Rx sparse join for dense group      | 0 |
| Rx Graft/Graft Ack no state         | 0 |
| Rx Graft on upstream if             | 0 |
| Rx CRP not BSR                      | 0 |
| Rx BSR when BSR                     | 0 |
| Rx BSR not RPF if                   | 0 |
| Rx unknown hello opt                | 0 |
| Rx data no state                    | 0 |
| Rx RP no state                      | 0 |
| Rx aggregate                        | 0 |
| Rx malformed packet                 | 0 |
| Rx illegal TTL                      | 0 |
| Rx illegal destination address      | 0 |
| No RP                               | 0 |
| No register encap if                | 0 |
| No route upstream                   | 0 |
| Nexthop Unusable                    | 0 |
| RP mismatch                         | 0 |
| RP mode mismatch                    | 0 |
| RPF neighbor unknown                | 0 |
| Rx Joins/Prunes filtered            | 0 |
| Tx Joins/Prunes filtered            | 0 |
| Embedded-RP invalid addr            | 0 |
| Embedded-RP limit exceed            | 0 |
| Embedded-RP added                   | 0 |
| Embedded-RP removed                 | 0 |
| Rx Register msgs filtering drop     | 0 |
| Tx Register msgs filtering drop     | 0 |
| Rx Bidir Join/Prune on non-Bidir if | 0 |
| Rx Bidir Join/Prune on non-DF if    | 0 |

## Sample Output

show pim statistics inet interface <interface-name>

```
user@host> show pim statistics inet interface ge-0/3/0.0
Instance: PIM.master Family: INET
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type   | Received | Sent | Rx errors |
|--------------------|----------|------|-----------|
| V2 Hello           | 0        | 4    | 0         |
| V2 Register        | 0        | 0    | 0         |
| V2 Register Stop   | 0        | 0    | 0         |
| V2 Join Prune      | 0        | 0    | 0         |
| V2 Bootstrap       | 0        | 0    | 0         |
| V2 Assert          | 0        | 0    | 0         |
| V2 Graft           | 0        | 0    | 0         |
| V2 Graft Ack       | 0        | 0    | 0         |
| V2 Candidate RP    | 0        | 0    | 0         |
| V1 Query           | 0        | 0    | 0         |
| V1 Register        | 0        | 0    | 0         |
| V1 Register Stop   | 0        | 0    | 0         |
| V1 Join Prune      | 0        | 0    | 0         |
| V1 RP Reachability | 0        | 0    | 0         |
| V1 Assert          | 0        | 0    | 0         |
| V1 Graft           | 0        | 0    | 0         |
| V1 Graft Ack       | 0        | 0    | 0         |

|                       |   |   |   |
|-----------------------|---|---|---|
| AutoRP Announce       | 0 | 0 | 0 |
| AutoRP Mapping        | 0 | 0 | 0 |
| AutoRP Unknown type   | 0 |   |   |
| Anycast Register      | 0 | 0 | 0 |
| Anycast Register Stop | 0 | 0 | 0 |

## Sample Output

**show pim statistics inet6 interface <interface-name>**

```
user@host> show pim statistics inet6 interface ge-0/3/0.0
Instance: PIM.master Family: INET6
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 4    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

## Sample Output

**show pim statistics interface <interface-name>**

```
user@host> show pim statistics interface ge-0/3/0.0
Instance: PIM.master Family: INET
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 3    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| V1 Query              | 0        | 0    | 0         |
| V1 Register           | 0        | 0    | 0         |
| V1 Register Stop      | 0        | 0    | 0         |
| V1 Join Prune         | 0        | 0    | 0         |
| V1 RP Reachability    | 0        | 0    | 0         |
| V1 Assert             | 0        | 0    | 0         |
| V1 Graft              | 0        | 0    | 0         |
| V1 Graft Ack          | 0        | 0    | 0         |
| AutoRP Announce       | 0        | 0    | 0         |
| AutoRP Mapping        | 0        | 0    | 0         |
| AutoRP Unknown type   | 0        |      |           |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

Instance: PIM.master Family: INET6

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 3    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

## show sap listen

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show sap listen<br><brief   detail><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Display the addresses that the router is listening to in order to receive multicast Session Announcement Protocol (SAP) session announcements.                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about the addresses that the router is listening to in order to receive multicast SAP session announcements.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>    | <a href="#">show sap listen on page 1666</a><br><a href="#">show sap listen brief on page 1666</a><br><a href="#">show sap listen detail on page 1667</a>                                                                                                                                                                                                                                               |
| <b>Output Fields</b>            | <a href="#">Table 136 on page 1666</a> describes the output fields for the <b>show sap listen</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                      |

**Table 136: show sap listen Output Fields**

| Field Name           | Field Description                                                            |
|----------------------|------------------------------------------------------------------------------|
| <b>Group address</b> | Address of the group that the local router is listening to for SAP messages. |
| <b>Port</b>          | UDP port number used for SAP.                                                |

## Sample Output

### show sap listen

```
user@host> show sap listen
Group address Port
224.2.127.254 9875
239.255.255.255 9875
```

### show sap listen brief

The output for the **show sap listen brief** command is identical to that for the **show sap listen** command. For sample output, see [show sap listen on page 1666](#).

### show sap listen detail

The output for the **show sap listen detail** command is identical to that for the **show sap listen** command. For sample output, see [show sap listen on page 1666](#).

## test msdp

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>test msdp (dependent-peers <i>prefix</i>   rpf-peer <i>originator</i>)</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Find Multicast Source Discovery Protocol (MSDP) peers.                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <b>dependent-peers <i>prefix</i></b> —Find downstream dependent MSDP peers.<br><br><b>rpf-peer <i>originator</i></b> —Find the MSDP reverse-path-forwarding (RPF) peer for the originator.<br><br><b>instance <i>instance-name</i></b> —(Optional) Find MDSP peers for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>    | <a href="#">test msdp dependent-peers on page 1668</a>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                               |

## Sample Output

### test msdp dependent-peers

```
user@host> test msdp dependent-peers 10.0.0.1/24
```

## CHAPTER 20

# IPv6 Operational Commands

- `clear ipv6 neighbors`
- `clear ipv6 router-advertisement`
- `show ipv6 neighbors`
- `show ipv6 router-advertisement`

## clear ipv6 neighbors

---

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear ipv6 neighbors</code><br><code>&lt;all   host <i>hostname</i>&gt;</code>                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.3 for EX Series switches.<br>Command introduced in Junos OS Release 12.2 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Clear IPv6 neighbor cache information.                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b>none</b> —Clear all IPv6 neighbor cache information.<br><br><b>all</b> —(Optional) Clear all IPv6 neighbor cache information.<br><br><b>host <i>hostname</i></b> —(Optional) Clear the information for the specified IPv6 neighbors.                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show ipv6 neighbors on page 1672</a></li></ul>                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">clear ipv6 neighbors on page 1670</a>                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                              |

### Sample Output

#### clear ipv6 neighbors

```
user@host> clear ipv6 neighbors
```



## clear ipv6 router-advertisement

|                                 |                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear ipv6 router-advertisement<br><interface <i>interface</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Clear IPv6 router advertisement counters.                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>none</b>—Clear IPv6 router advertisement counters for all interfaces.</p> <p><b>interface <i>interface</i></b>—(Optional) Clear IPv6 router advertisement counters for the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show ipv6 router-advertisement on page 1674</a></li> </ul>                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">clear ipv6 router-advertisement on page 1671</a>                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                 |

## Sample Output

### clear ipv6 router-advertisement

```
user@host> clear ipv6 router-advertisement
```

## show ipv6 neighbors

|                                 |                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ipv6 neighbors                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.2 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> |
| <b>Description</b>              | Display information about the IPv6 neighbor cache.                                                                                                                                                                                                                                    |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear ipv6 neighbors on page 1670</a></li> </ul>                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show ipv6 neighbors on page 1672</a>                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | <p><a href="#">Table 137 on page 1672</a> describes the output fields for the <b>show ipv6 neighbors</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                         |

**Table 137: show ipv6 neighbors Output Fields**

| Field Name        | Field Description                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------|
| IPv6 Address      | Name of the IPv6 interface.                                                                                                |
| Linklayer Address | Link-layer address.                                                                                                        |
| State             | State of the link: <b>up</b> , <b>down</b> , <b>incomplete</b> , <b>reachable</b> , <b>stale</b> , or <b>unreachable</b> . |
| Exp               | Number of seconds until the entry expires.                                                                                 |
| Rtr               | Whether the neighbor is a routing device: <b>yes</b> or <b>no</b> .                                                        |
| Secure            | Whether this entry was created using the Secure Neighbor Discovery (SEND) protocol: <b>yes</b> or <b>no</b> .              |
| Interface         | Name of the interface.                                                                                                     |

## Sample Output

### show ipv6 neighbors

```

user@host> show ipv6 neighbors
IPv6 Address Linklayer Address State Exp Rtr Secure
Interface
2001:db8:0:1:2a0:a514:0:24c 00:05:85:8f:c8:bd stale 546 yes no

```

|                      |                   |       |     |        |
|----------------------|-------------------|-------|-----|--------|
| fe-1/2/0.1           |                   |       |     |        |
| fe80::2a0:a514:0:24c | 00:05:85:8f:c8:bd | stale | 258 | yes no |
| fe-1/2/0.1           |                   |       |     |        |
| fe80::2a0:a514:0:64c | 00:05:85:8f:c8:bd | stale | 111 | yes no |
| fe-1/2/1.5           |                   |       |     |        |
| fe80::2a0:a514:0:a4c | 00:05:85:8f:c8:bd | stale | 327 | yes no |
| fe-1/2/2.9           |                   |       |     |        |

## show ipv6 router-advertisement

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show ipv6 router-advertisement &lt;conflicts&gt; &lt;interface <i>interface</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;prefix <i>prefix/prefix length</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 12.2 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display information about IPv6 router advertisements, including statistics about messages sent and received on interfaces, and information received from advertisements from other routers.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>none</b>—Display all IPv6 router advertisement information for all interfaces.</p> <p><b>conflicts</b>—(Optional) Display only the IPv6 router advertisement information that is conflicting.</p> <p><b>interface <i>interface</i></b>—(Optional) Display IPv6 router advertisement information for the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>prefix <i>prefix/prefix length</i></b>—(Optional) Display IPv6 router advertisement information for the specified prefix.</p> |
| <b>Additional Information</b>   | The display identifies conflicting information by enclosing the value the router is advertising in brackets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">clear ipv6 router-advertisement on page 1671</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <p><a href="#">show ipv6 router-advertisement on page 1675</a></p> <p><a href="#">show ipv6 router-advertisement conflicts on page 1676</a></p> <p><a href="#">show ipv6 router-advertisement prefix on page 1676</a></p>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | <a href="#">Table 138 on page 1674</a> describes the output fields for the <b>show ipv6 router-advertisement</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 138: show ipv6 router-advertisement Output Fields

| Field Name          | Field Description                                                           |
|---------------------|-----------------------------------------------------------------------------|
| Interface           | Name of the interface.                                                      |
| Advertisements sent | Number of router advertisements sent and elapsed time since they were sent. |

Table 138: show ipv6 router-advertisement Output Fields (*continued*)

| Field Name              | Field Description                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Solicits received       | Number of solicitation messages received.                                                                                     |
| Advertisements received | Number of router advertisements received.                                                                                     |
| Advertisements from     | Names of interfaces from which router advertisements have been received and elapsed time since the last one was received.     |
| Managed                 | Managed address configuration flag: 0 (stateless) or 1 (stateful).                                                            |
| Other configuration     | Other stateful configuration flag: 0 (stateless) or 1 (stateful).                                                             |
| Reachable time          | Time that a node identifies a neighbor as reachable after receiving a reachability confirmation, in milliseconds.             |
| Default lifetime        | Default lifetime, in seconds: from 0 seconds to 18.2 hours. A setting of 0 indicates that the router is not a default router. |
| Retransmit timer        | Time between retransmitted Neighbor Solicitation messages, in milliseconds.                                                   |
| Current hop limit       | Configured current hop limit.                                                                                                 |
| Prefix                  | Name and length of the prefix.                                                                                                |
| Valid lifetime          | How long the prefix remains valid for onlink determination.                                                                   |
| Preferred lifetime      | How long the prefix generated by stateless autoconfiguration remains preferred.                                               |
| On link                 | Onlink flag: 0 (not onlink) or 1 (onlink).                                                                                    |
| Autonomous              | Autonomous address configuration flag: 0 (not autonomous) or 1 (autonomous).                                                  |

## Sample Output

### show ipv6 router-advertisement

```

user@host> show ipv6 router-advertisement
Interface: fe-0/1/1.0
 Advertisements sent: 0
 Solicits received: 0
 Advertisements received: 0
Interface: fxp0.0
 Advertisements sent: 0
 Solicits received: 0
 Advertisements received: 1
 Advertisement from fe80::2d0:b7ff:fe1e:7b0e, heard 00:00:13 ago
 Managed: 0
 Other configuration: 0 [1]
 Reachable time: 0 ms
 Default lifetime: 1800 sec

```

```
Retransmit timer: 0 ms
Current hop limit: 64
```

#### show ipv6 router-advertisement conflicts

```
user@host> show ipv6 router-advertisement conflicts
Interface: fxp0.0
 Advertisement from fe80::2d0:b7ff:fe1e:7b0e, heard 00:01:08 ago
 Other configuration: 0 [1]
```

#### show ipv6 router-advertisement prefix

```
user@host> show ipv6 router-advertisement prefix 8040::/16
Interface: fe-0/1/3.0
 Advertisements sent: 3, last sent 00:04:11 ago
 Solicits received: 0
 Advertisements received: 3
 Advertisement from fe80::290:69ff:fe9a:5403, heard 00:00:05 ago
 Managed: 0
 Other configuration: 0
 Reachable time: 0 ms
 Default lifetime: 180 sec [1800 sec]
 Retransmit timer: 0 ms
 Current hop limit: 64
 Prefix: 8040:1::/64
 Valid lifetime: 2592000 sec
 Preferred lifetime: 604800 sec
 On link: 1
 Autonomous: 1
```

## CHAPTER 21

# IS-IS Operational Commands

- clear isis adjacency
- clear isis database
- clear isis overload
- clear isis statistics
- show isis adjacency
- show isis authentication
- show isis backup coverage
- show isis backup label-switched-path
- show isis backup spf results
- show isis context-identifier
- show isis database
- show isis hostname
- show isis interface
- show isis overview
- show isis route
- show isis spf
- show isis statistics

## clear isis adjacency

---

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                             | <a href="#">Syntax on page 1678</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1678</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Syntax                                     | <pre>clear isis adjacency &lt;all&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Syntax (EX Series Switches and QFX Series) | <pre>clear isis adjacency &lt;all&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Release Information                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>all option introduced in Junos OS Release 14.2.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description                                | Remove entries from the IS-IS adjacency database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Options                                    | <p><b>none   all</b>—(Optional) Remove all entries from the adjacency database.<br/>Both <b>clear isis adjacency</b> and <b>clear isis adjacency all</b> function identically.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear all adjacencies for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear all adjacencies for the specified interface only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor</b>—(Optional) Clear adjacencies for the specified neighbor only.</p> |
| Required Privilege Level                   | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Related Documentation                      | <ul style="list-style-type: none"><li>• <a href="#">show isis adjacency on page 1686</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| List of Sample Output                      | <a href="#">clear isis adjacency on page 1679</a><br><a href="#">clear isis adjacency all on page 1679</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Output Fields                              | See <a href="#">show isis adjacency</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



## Sample Output

### clear isis adjacency

The following sample output displays IS-IS adjacency database information before and after the **clear isis adjacency** command is entered:

```
user@host> show isis adjacency
IS-IS adjacency database:
Interface System L State Hold (secs) SNPA
so-1/0/0.0 karakul 3 Up 26
so-1/1/3.0 1921.6800.5080 3 Up 23
so-5/0/0.0 1921.6800.5080 3 Up 19
```

```
user@host> clear isis adjacency karakul
```

```
user@host> show isis adjacency
IS-IS adjacency database:
Interface System L State Hold (secs) SNPA
so-1/0/0.0 karakul 3 Initializing 26
so-1/1/3.0 1921.6800.5080 3 Up 24
so-5/0/0.0 1921.6800.5080 3 Up 21
```

### clear isis adjacency all

```
user@host> clear isis adjacency all
IS-IS adjacency database:
Interface System L State Hold (secs) SNPA
so-1/0/0.0 karakul 3 Initializing 26
so-1/1/3.0 1921.6800.5080 3 Initializing 24
so-5/0/0.0 1921.6800.5080 3 Initializing 21
```

## clear isis database

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1680</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1680</a>                                                                                                                                                                                                                                                                                                           |
| <b>Syntax</b>                                     | <pre>clear isis database &lt;entries&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>clear isis database &lt;entries&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Command introduced in 15.1X53-D30 for QFX10002 switch.                                                                                             |
| <b>Description</b>                                | Remove the entries from the IS-IS link-state database, which contains prefixes and topology information.                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                    | <b>none</b> —Remove all entries from the IS-IS link-state database for all routing instances.<br><br><b>entries</b> —(Optional) Name of the database entry.<br><br><b>instance instance-name</b> —(Optional) Clear all entries for the specified routing instance.<br><br><b>logical-system (all   logical-system-name)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                   | clear                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <a href="#">show isis database on page 1702</a></li></ul>                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>                      | <a href="#">clear isis database on page 1680</a>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>                              | See <a href="#">show isis database</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                              |

## Sample Output

### clear isis database

The following sample output displays IS-IS link-state database information before and after the **clear isis database** command is entered:

```
user@host> show isis database
IS-IS level 1 link-state database:
LSP ID Sequence Checksum Lifetime (secs)
crater.00-00 0x12 0x84dd 1139
```

```
1 LSPs
IS-IS level 2 link-state database:
LSP ID Sequence Checksum Lifetime (secs)
crater.00-00 0x19 0xe92c 1134
badlands.00-00 0x16 0x1454 985
carlsbad.00-00 0x33 0x220b 1015
ranier.00-00 0x2e 0xfc31 1007
1921.6800.5066.00-00 0x11 0x7313 566
1921.6800.5067.00-00 0x14 0xd9d4 939
6 LSPs
```

```
user@host> clear isis database
```

```
user@host> show isis database
IS-IS level 1 link-state database:
LSP ID Sequence Checksum Lifetime (secs)

IS-IS level 2 link-state database:
LSP ID Sequence Checksum Lifetime (secs)
```

## clear isis overload

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1682</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1682</a>                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                                     | <code>clear isis overload</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <code>clear isis overload</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                  |
| <b>Description</b>                                | <p>Reset the IS-IS dynamic overload bit. This command can appear to not work, continuing to display <b>overload</b> after execution. The bit is reset only if the root cause is corrected by configuration remotely or locally.</p> <p>When other routers detect that the overload bit is set, they do not use this routing device for transit traffic, but they do use it for packets destined to the overloaded routing device's directly connected networks and IP prefixes.</p> |
| <b>Options</b>                                    | <p><b>none</b>—Reset the IS-IS dynamic overload bit.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Reset the IS-IS dynamic overload bit for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                |
| <b>Required Privilege Level</b>                   | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <a href="#">show isis database on page 1702</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>                      | <a href="#">clear isis overload on page 1682</a>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>                              | See <a href="#">show isis database</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                         |

## Sample Output

### clear isis overload

The following sample output displays IS-IS database information before and after the **clear isis overload** command is entered:

```
user@host> show isis database
```

IS-IS level 1 link-state database:

| LSP ID       | Sequence | Checksum | Lifetime | Attributes            |
|--------------|----------|----------|----------|-----------------------|
| pro3-c.00-00 | 0x4      | 0x10db   | 1185     | L1 L2 <b>Overload</b> |

1 LSPs

IS-IS level 2 link-state database:

| LSP ID       | Sequence | Checksum | Lifetime | Attributes            |
|--------------|----------|----------|----------|-----------------------|
| pro3-c.00-00 | 0x5      | 0x429f   | 1185     | L1 L2 <b>Overload</b> |

|              |       |        |     |       |
|--------------|-------|--------|-----|-------|
| pro2-a.00-00 | 0x91e | 0x2589 | 874 | L1 L2 |
|--------------|-------|--------|-----|-------|

|              |     |       |     |       |
|--------------|-----|-------|-----|-------|
| pro2-a.02-00 | 0x1 | 0xcbc | 874 | L1 L2 |
|--------------|-----|-------|-----|-------|

3 LSPs

user@host> clear isis overload

user@host> show isis database

IS-IS level 1 link-state database:

| LSP ID       | Sequence | Checksum | Lifetime | Attributes |
|--------------|----------|----------|----------|------------|
| pro3-c.00-00 | 0xa      | 0x429e   | 1183     | L1 L2      |

1 LSPs

IS-IS level 2 link-state database:

| LSP ID       | Sequence | Checksum | Lifetime | Attributes |
|--------------|----------|----------|----------|------------|
| pro3-c.00-00 | 0xc      | 0x9c39   | 1183     | L1 L2      |

|              |       |        |     |       |
|--------------|-------|--------|-----|-------|
| pro2-a.00-00 | 0x91e | 0x2589 | 783 | L1 L2 |
|--------------|-------|--------|-----|-------|

|              |     |       |     |       |
|--------------|-----|-------|-----|-------|
| pro2-a.02-00 | 0x1 | 0xcbc | 783 | L1 L2 |
|--------------|-----|-------|-----|-------|

3 LSPs

## clear isis statistics

---

|                                            |                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                             | <a href="#">Syntax on page 1684</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1684</a>                                                                                                                                                                                                                                                                  |
| Syntax                                     | <code>clear isis statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                              |
| Syntax (EX Series Switches and QFX Series) | <code>clear isis statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                        |
| Release Information                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                              |
| Description                                | Set statistics about IS-IS traffic to zero.                                                                                                                                                                                                                                                                                                                                     |
| Options                                    | <b>none</b> —Set IS-IS traffic statistics to zero for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Set IS-IS traffic statistics to zero for the specified routing instance only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| Required Privilege Level                   | view                                                                                                                                                                                                                                                                                                                                                                            |
| Related Documentation                      | <ul style="list-style-type: none"><li>• <a href="#">show isis statistics on page 1728</a></li></ul>                                                                                                                                                                                                                                                                             |
| List of Sample Output                      | <a href="#">clear isis statistics on page 1684</a>                                                                                                                                                                                                                                                                                                                              |
| Output Fields                              | See <a href="#">show isis statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                   |

## Sample Output

### clear isis statistics

The following sample output displays IS-IS statistics before and after the **clear isis statistics** command is entered:

```
user@host> show isis statistics
IS-IS statistics for merino:
```

| PDU type | Received | Processed | Drops | Sent   | Rexmit |
|----------|----------|-----------|-------|--------|--------|
| LSP      | 12793    | 12793     | 0     | 8666   | 719    |
| IIH      | 116751   | 116751    | 0     | 118834 | 0      |
| CSNP     | 203956   | 203956    | 0     | 204080 | 0      |
| PSNP     | 7356     | 7350      | 6     | 8635   | 0      |
| Unknown  | 0        | 0         | 0     | 0      | 0      |

```
Totals 340856 340850 6 340215 719
```

```
Total packets received: 340856 Sent: 340934
```

```
SNP queue length: 0 Drops: 0
LSP queue length: 0 Drops: 0
```

```
SPF runs: 1064
Fragments rebuilt: 1087
LSP regenerations: 436
Purges initiated: 0
```

```
user@host> clear isis statistics
```

```
user@host> show isis statistics
IS-IS statistics for merino:
```

| PDU type | Received | Processed | Drops | Sent | Rexmit |
|----------|----------|-----------|-------|------|--------|
| LSP      | 0        | 0         | 0     | 0    | 0      |
| IIH      | 3        | 3         | 0     | 3    | 0      |
| CSNP     | 2        | 2         | 0     | 4    | 0      |
| PSNP     | 0        | 0         | 0     | 0    | 0      |
| Unknown  | 0        | 0         | 0     | 0    | 0      |
| Totals   | 5        | 5         | 0     | 7    | 0      |

```
Total packets received: 5 Sent: 7
```

```
SNP queue length: 0 Drops: 0
LSP queue length: 0 Drops: 0
```

```
SPF runs: 0
Fragments rebuilt: 0
LSP regenerations: 0
Purges initiated: 0
```

## show isis adjacency

---

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                             | <a href="#">Syntax on page 1686</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1686</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Syntax                                     | <pre>show isis adjacency &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Syntax (EX Series Switches and QFX Series) | <pre>show isis adjacency &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Release Information                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description                                | Display information about IS-IS neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Options                                    | <p><b>none</b>—Display standard information about IS-IS neighbors for all routing instances.</p> <p><b><i>system id</i></b>—(Optional) Display information about IS-IS neighbors for the specified intermediate system.</p> <p><b>brief   detail   extensive</b>—(Optional) Display standard information about IS-IS neighbors with the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about IS-IS neighbors for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Display information about IS-IS neighbors for all logical systems or for a particular logical system.</p> |
| Required Privilege Level                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Related Documentation                      | <ul style="list-style-type: none"><li>• <a href="#">clear isis adjacency on page 1678</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| List of Sample Output                      | <a href="#">show isis adjacency on page 1688</a><br><a href="#">show isis adjacency brief on page 1688</a><br><a href="#">show isis adjacency detail on page 1689</a><br><a href="#">show isis adjacency extensive on page 1689</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Output Fields                              | <a href="#">Table 139 on page 1687</a> describes the output fields for the <b>show isis adjacency</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 139: show isis adjacency Output Fields

| Field Name                                | Field Description                                                                                                                                                                                                                               | Level of Output         |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Interface</b>                          | Interface through which the neighbor is reachable.                                                                                                                                                                                              | All levels              |
| <b>System</b>                             | System identifier ( <b>sysid</b> ), displayed as a name, if possible.                                                                                                                                                                           | <b>brief</b>            |
| <b>L or Level</b>                         | Level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> An exclamation point (!) preceding the level number indicates that the adjacency is missing an IP address. | All levels              |
| <b>State</b>                              | State of the adjacency: <b>Up</b> , <b>Down</b> , <b>New</b> , <b>One-way</b> , <b>Initializing</b> , or <b>Rejected</b> .                                                                                                                      | All levels              |
| <b>Hold (secs)</b>                        | Remaining hold time of the adjacency.                                                                                                                                                                                                           | <b>brief</b>            |
| <b>SNPA</b>                               | Subnetwork point of attachment (MAC address of the next hop).                                                                                                                                                                                   | <b>brief</b>            |
| <b>Expires in</b>                         | How long until the adjacency expires, in seconds.                                                                                                                                                                                               | <b>detail</b>           |
| <b>Priority</b>                           | Priority to become the designated intermediate system.                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Up/Down transitions</b>                | Count of adjacency status changes from <b>Up</b> to <b>Down</b> or from <b>Down</b> to <b>Up</b> .                                                                                                                                              | <b>detail</b>           |
| <b>Last transition</b>                    | Time of the last <b>Up/Down</b> transition.                                                                                                                                                                                                     | <b>detail</b>           |
| <b>Circuit type</b>                       | Bit mask of levels on this interface: 1=Level 1 router; 2=Level 2 router; 3=both Level 1 and Level 2 router.                                                                                                                                    | <b>detail</b>           |
| <b>Speaks</b>                             | Protocols supported by this neighbor.                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>MAC address</b>                        | MAC address of the interface.                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Topologies</b>                         | Supported topologies.                                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>Restart capable</b>                    | Whether a neighbor is capable of graceful restart: <b>Yes</b> or <b>No</b> .                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Adjacency advertisement: Advertise</b> | This routing device has signaled to advertise this interface to its neighbors in their link-state PDUs.                                                                                                                                         | <b>detail extensive</b> |
| <b>Adjacency advertisement: Suppress</b>  | This neighbor has signaled not to advertise the interface in the routing device's outbound link-state PDUs.                                                                                                                                     | <b>detail extensive</b> |
| <b>IP addresses</b>                       | IP address of this neighbor.                                                                                                                                                                                                                    | <b>detail extensive</b> |

Table 139: show isis adjacency Output Fields (*continued*)

| Field Name     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Transition log | <p>List of recent transitions, including:</p> <ul style="list-style-type: none"> <li>• <b>When</b>—Time at which an IS-IS adjacency transition occurred.</li> <li>• <b>State</b>—Current state of the IS-IS adjacency (<b>up</b>, <b>down</b>, or <b>rejected</b>). <ul style="list-style-type: none"> <li>• <b>Up</b>—Adjacency is up and operational.</li> <li>• <b>Down</b>—Adjacency is down and not available.</li> <li>• <b>Rejected</b>—Adjacency has been rejected.</li> </ul> </li> <li>• <b>Event</b>—Type of transition that occurred. <ul style="list-style-type: none"> <li>• <b>Seenself</b>—Possible routing loop has been detected.</li> <li>• <b>Interface down</b>—IS-IS interface has gone down and is no longer available.</li> <li>• <b>Error</b>—Adjacency error.</li> </ul> </li> <li>• <b>Down reason</b>—Reason that an IS-IS adjacency is down: <ul style="list-style-type: none"> <li>• <b>3-Way Handshake Failed</b>—Connection establishment failed.</li> <li>• <b>Address Mismatch</b>—Address mismatch caused link failure.</li> <li>• <b>Aged Out</b>—Link expired.</li> <li>• <b>ISO Area Mismatch</b>—IS-IS area mismatch caused link failure.</li> <li>• <b>Bad Hello</b>—Unacceptable hello message caused link failure.</li> <li>• <b>BFD Session Down</b>—Bidirectional failure detection caused link failure.</li> <li>• <b>Interface Disabled</b>—IS-IS interface is disabled.</li> <li>• <b>Interface Down</b>—IS-IS interface is unavailable.</li> <li>• <b>Interface Level Disabled</b>—IS-IS level is disabled.</li> <li>• <b>Level Changed</b>—IS-IS level has changed on the adjacency.</li> <li>• <b>Level Mismatch</b>—Levels on adjacency are not compatible.</li> <li>• <b>MPLS LSP Down</b>—Label-switched path (LSP) is unavailable.</li> <li>• <b>MT Topology Changed</b>—IS-IS topology has changed.</li> <li>• <b>MT Topology Mismatch</b>—IS-IS topology is mismatched.</li> <li>• <b>Remote System ID Changed</b>—Adjacency peer system ID changed.</li> <li>• <b>Protocol Shutdown</b>—IS-IS protocol is disabled.</li> <li>• <b>CLI Command</b>—Adjacency brought down by user.</li> <li>• <b>Unknown</b>—Unknown.</li> </ul> </li> </ul> | extensive       |

## Sample Output

### show isis adjacency

```

user@host> show isis adjacency
Interface System L State Hold (secs) SNPA
at-2/3/0.0 ranier 3 Up 23

```

### show isis adjacency brief

The output for the **show isis adjacency brief** command is identical to that for the **show isis adjacency** command. For sample output, see [show isis adjacency on page 1688](#).

### show isis adjacency detail

```
user@host> show isis adjacency detail
ranier
Interface: at-2/3/0.0, Level: 3, State: Up, Expires in 21 secs
Priority: 0, Up/Down transitions: 1, Last transition: 00:01:09 ago
Circuit type: 3, Speaks: IP, IPv6
Topologies: Unicast
Restart capable: Yes
IP addresses: 11.1.1.2
```

### show isis adjacency extensive

```
user@host> show isis adjacency extensive
ranier
Interface: at-2/3/0.0, Level: 3, State: Up, Expires in 22 secs
Priority: 0, Up/Down transitions: 1, Last transition: 00:01:16 ago
Circuit type: 3, Speaks: IP, IPv6
Topologies: Unicast
Restart capable: Yes
IP addresses: 11.1.1.2
Transition log:
When State Event Down reason
Wed Nov 8 21:24:25 Up Seenself
```

## show isis authentication

|                                                   |                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1690</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1690</a>                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                     | <code>show isis authentication</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                  |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <code>show isis authentication</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                        | Command introduced in Junos OS Release 7.5.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for hitless authentication key rollover introduced in Junos OS Release 11.2.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>                                | Display information about IS-IS authentication.                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                    | <b>none</b> —Display information about IS-IS authentication.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display IS-IS authentication for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.     |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li><a href="#">show security keychain</a></li></ul>                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>                      | <a href="#">show isis authentication on page 1691</a><br><a href="#">show isis authentication (With Hitless Authentication Key Rollover Configured) on page 1691</a>                                                                                                                                                                                   |
| <b>Output Fields</b>                              | <a href="#">Table 140 on page 1690</a> describes the output fields for the <b>show isis authentication</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                            |

Table 140: show isis authentication Output Fields

| Field Name | Field Description |
|------------|-------------------|
| Interface  | Interface name.   |
| Level      | IS-IS level.      |

Table 140: show isis authentication Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| IIH Auth              | IS-IS Hello (IIH) packet authentication type.<br><br>Displays the name of the active keychain if hitless authentication key rollover is configured. |
| CSN Auth              | Complete sequence number authentication type.                                                                                                       |
| PSN Auth              | Partial sequence number authentication type.                                                                                                        |
| L1 LSP Authentication | Layer 1 link-state PDU authentication type.                                                                                                         |
| L2 LSP Authentication | Layer 2 link-state PDU authentication type.                                                                                                         |

## Sample Output

### show isis authentication

```

user@host> show isis authentication
Interface Level IIH Auth CSN Auth PSN Auth
at-2/3/0.0 1 Simple Simple Simple
 2 MD5 MD5 MD5

L1 LSP Authentication: Simple
L2 LSP Authentication: MD5

```

### show isis authentication (With Hitless Authentication Key Rollover Configured)

```

user@host> show isis authentication
Interface Level IIH Auth CSN Auth PSN Auth
so-0/1/3.0 2 hakrhello MD5 MD5

L2 LSP Authentication: MD5

```

## show isis backup coverage

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <pre>show isis backup coverage &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show isis backup coverage &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                        | <p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                   |
| <b>Description</b>                                | Display information about the level of backup coverage available.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                                    | <p><b>none</b>—Display information about the level of backup coverage available for all the nodes and prefixes in the network.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the level of backup coverage for a specific IS-IS routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"> <li>• <i>Understanding Loop-Free Alternate Routes for IS-IS</i></li> <li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li> <li>• <a href="#">show isis backup label-switched-path on page 1694</a></li> </ul>                                                                                                                                                            |
| <b>List of Sample Output</b>                      | <a href="#">show isis backup coverage on page 1693</a>                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>                              | <p><a href="#">Table 141 on page 1692</a> lists the output fields for the <b>show isis backup coverage</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                     |

**Table 141: show isis backup coverage Output Fields**

| Field Name      | Field Description                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------|
| <b>Topology</b> | Type of topology or address family: <b>IPv4 Unicast</b> or <b>IPv6 Unicast</b> .                             |
| <b>Level</b>    | IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1</li> <li>• 2—Level 2</li> </ul>              |
| <b>Node</b>     | By topology, the percentage of all routes configured on the node that are protected through backup coverage. |

Table 141: show isis backup coverage Output Fields (*continued*)

| Field Name | Field Description                                                                                      |
|------------|--------------------------------------------------------------------------------------------------------|
| IPv4       | Percentage of IPv4 unicast routes that are protected through backup coverage.                          |
| IPv6       | Percentage of IPv6 unicast routes that are protected through backup coverage.                          |
| CLNS       | Percentage of Connectionless Network Service (CLNS) routes that are protected through backup coverage. |

Sample Output

show isis backup coverage

```
user@host> show isis backup coverage
Backup Coverage:
 Topology Level Node IPv4 IPv6 CLNS
 IPV4 Unicast 2 28.57% 22.22% 0.00% 0.00%
 IPV6 Unicast 2 0.00% 0.00% 0.00% 0.00%
```

## show isis backup label-switched-path

|                                                   |                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <b>show isis backup label-switched-path</b><br><b>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</b>                                                                                                                                                               |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <b>show isis backup label-switched-path</b>                                                                                                                                                                                                                                   |
| <b>Release Information</b>                        | Command introduced in Junos OS Release 9.5.<br>Command introduced in Junos OS Release 9.5 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                |
| <b>Description</b>                                | Display information about MPLS label-switched-paths (LSPs) designated as backup routes for IS-IS routes.                                                                                                                                                                      |
| <b>Options</b>                                    | <b>none</b> —Display information about MPLS LSPs designated as backup routes for IS-IS routes.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                   |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"> <li>• <i>Understanding Loop-Free Alternate Routes for IS-IS</i></li> <li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li> <li>• <a href="#">show isis backup coverage on page 1692</a></li> </ul> |
| <b>List of Sample Output</b>                      | <a href="#">show isis backup label-switched-path on page 1695</a>                                                                                                                                                                                                             |
| <b>Output Fields</b>                              | <a href="#">Table 142 on page 1694</a> lists the output fields for the <b>show isis backup label-switched-path</b> command. Output fields are listed in the approximate order in which they appear.                                                                           |

**Table 142: show isis backup label-switched-path Output Fields**

| Field Name              | Field Description                                              |
|-------------------------|----------------------------------------------------------------|
| <b>Backup MPLS LSPs</b> | List of MPLS LSPs designated as backup paths for IS-IS routes. |
| <b>Egress</b>           | IP address of the egress routing device for the LSP.           |



Table 142: show isis backup label-switched-path Output Fields (*continued*)

| Field Name  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status      | <p>State of the LSP:</p> <ul style="list-style-type: none"> <li>• <b>Up</b>—The routing device can detect RSVP hello messages from the neighbor.</li> <li>• <b>Down</b>—The routing device has received one of the following indications: <ul style="list-style-type: none"> <li>• Communication failure from the neighbor.</li> <li>• Communication from IGP that the neighbor is unavailable.</li> <li>• Change in the sequence numbers in the RSVP hello messages sent by the neighbor.</li> </ul> </li> <li>• <b>Deleted</b>—LSP is no longer available as a backup path.</li> </ul> |
| Last change | Time elapsed since the neighbor state changed either from up to down or from down to up. The format is <i>hh:mm:ss</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| TE-metric   | Configured traffic engineering metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Metric      | Configured metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Sample Output

### show isis backup label-switched-path

```

user@host> show isis backup label-switched-path
Backup MPLS LSPs:
f-to-g, Egress: 192.168.1.4, Status: up, Last change: 06:12:03
TE-metric: 9, Metric: 0

```

## show isis backup spf results

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                      | <pre>show isis backup spf results &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;no-coverage&gt; &lt;topology (ipv4-unicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Syntax (EX Series Switches) | <pre>show isis backup spf results &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;no-coverage&gt; &lt;topology (ipv4-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Release Information         | Command introduced in Junos OS Release 9.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description                 | Display information about IS-IS shortest-path-first (SPF) calculations for backup paths.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Options                     | <p><b>none</b>—Display information about IS-IS SPF calculations for all backup paths for all destination nodes.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display SPF calculations for backup paths for the specified routing instance.</p> <p><b>level (1   2)</b>—(Optional) Display SPF calculations for the backup paths for the specified IS-IS level.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display SPF calculations for the backup paths for all logical systems or on a particular logical system.</p> <p><b>no-coverage</b>—(Optional) Display SPF calculations only for destinations that do not have backup coverage.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display SPF calculations for backup paths for the specified topology only.</p> |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Related Documentation       | <ul style="list-style-type: none"><li>• <i>Example: Configuring Link and Node Protection for IS-IS Routes</i></li><li>• <a href="#">show isis backup coverage on page 1692</a></li><li>• <i>Understanding Loop-Free Alternate Routes for IS-IS</i></li><li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| List of Sample Output       | <p><a href="#">show isis backup spf results on page 1697</a></p> <p><a href="#">show isis backup spf results no-coverage on page 1698</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Output Fields               | <p><a href="#">Table 143 on page 1697</a> lists the output fields for the <b>show isis backup spf results</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 143: show isis backup spf results Output Fields

| Field Name              | Field Description                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------|
| <i>node-name</i>        | Name of the destination node.                                                                      |
| <b>Address</b>          | Address of the destination node.                                                                   |
| <b>Primary next-hop</b> | Interface and name of the node of the primary next hop to reach the destination.                   |
| <b>Root</b>             | Name of the next-hop neighbor.                                                                     |
| <b>Metric</b>           | Metric to the node.                                                                                |
| <b>Eligible</b>         | Indicates that the next-hop neighbor has been designated as a backup path to the destination node. |
| <b>Backup next-hop</b>  | Name of the interface of the backup next hop.                                                      |
| <b>SNPA</b>             | Subnetwork point of attachment (MAC address of the next hop).                                      |
| <b>LSP</b>              | Name of the MPLS label-switched path (LSP) designated as a backup path.                            |
| <b>Not eligible</b>     | Indicates that the next-hop neighbor cannot function as a backup path to the destination.          |
| <b>Reason</b>           | Describes why the next-hop neighbor is designated as <b>Not eligible</b> as a backup path.         |

## Sample Output

### show isis backup spf results

```

user@host> show isis backup spf results

IS-IS level 1 SPF results:
 0 nodes

IS-IS level 2 SPF results:
banff.00
 Primary next-hop: so-6/0/0.0, IPV4, olympic
 Primary next-hop: ae0.0, IPV4, camaro, SNPA: 0:90:69:f:67:f0
 Primary next-hop: so-6/0/0.0, IPV6, olympic
 Primary next-hop: ae0.0, IPV6, camaro, SNPA: 0:90:69:f:67:f0
 Root: camaro, Root Metric: 10, Metric: 10
 Not eligible, Reason: Primary next-hop multipath
 Root: olympic, Root Metric: 10, Metric: 10
 Not eligible, Reason: Primary next-hop multipath
 Root: glacier, Root Metric: 10, Metric: 25
 Not eligible, Reason: Primary next-hop multipath
crater.00
 Primary next-hop: so-6/0/0.0, IPV4, olympic
 Primary next-hop: so-6/0/0.0, IPV6, olympic

```

```

Root: olympic, Root Metric: 10, Metric: 10
 Not eligible, Reason: Primary next-hop link fate sharing
Root: glacier, Root Metric: 10, Metric: 15
 Eligible, Backup next-hop: as0.0, IPV4, glacier
 Eligible, Backup next-hop: as0.0, IPV6, glacier
Root: camaro, Root Metric: 10, Metric: 20
 Not eligible, Reason: Interface is already covered
olympic.00
 Primary next-hop: so-6/0/0.0, IPV4, olympic
 Primary next-hop: so-6/0/0.0, IPV6, olympic
 Root: olympic, Root Metric: 10, Metric: 0
 Not eligible, Reason: Primary next-hop link fate sharing
 Root: camaro, Root Metric: 10, Metric: 20
 track-item: olympic.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
 Root: glacier, Root Metric: 10, Metric: 20
 track-item: olympic.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
camaro.00
 Primary next-hop: ae0.0, IPV4, camaro, SNPA: 0:90:69:f:67:f0
 Primary next-hop: ae0.0, IPV6, camaro, SNPA: 0:90:69:f:67:f0
 Root: camaro, Root Metric: 10, Metric: 0
 Not eligible, Reason: Primary next-hop link fate sharing
 Root: glacier, Root Metric: 10, Metric: 20
 track-item: camaro.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
 Root: olympic, Root Metric: 10, Metric: 20
 track-item: camaro.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
glacier.00
 Primary next-hop: as0.0, IPV4, glacier
 Primary next-hop: as0.0, IPV6, glacier
 Root: glacier, Root Metric: 10, Metric: 0
 Not eligible, Reason: Primary next-hop link fate sharing
 Root: camaro, Root Metric: 10, Metric: 20
 track-item: glacier.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
 Root: olympic, Root Metric: 10, Metric: 20
 track-item: glacier.00-00
 track-item: kobuk.00-00
 Not eligible, Reason: Path loops
5 nodes

```

#### show isis backup spf results no-coverage

```

user@host> show isis backup spf results no-coverage
IS-IS level 1 SPF results:
pro-bng3-k.00
 Primary next-hop: fe-1/3/3.0, IPV4, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
 Primary next-hop: fe-1/3/3.0, IPV6, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
 Root: pro-bng3-k, Root Metric: 10, Metric: 0, Root Preference: 0x0
 Root: pro-bng3-i, Root Metric: 10, Metric: 20, Root Preference: 0x0
 track-item: pro-bng3-k.00-00
 track-item: pro-bng3-j.00-00
pro-bng3-i.00
 Primary next-hop: fe-0/1/2.0, IPV4, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21

```

```

Primary next-hop: fe-0/1/2.0, IPV6, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21
Root: pro-bng3-i, Root Metric: 10, Metric: 0, Root Preference: 0x0
Root: pro-bng3-k, Root Metric: 10, Metric: 20, Root Preference: 0x0
track-item: pro-bng3-j.00-00
track-item: pro-bng3-i.00-00
2 nodes

```

IS-IS level 2 SPF results:

olympic.00

```

Primary next-hop: so-6/0/0.0, IPV4, olympic
Primary next-hop: so-6/0/0.0, IPV6, olympic
Root: olympic, Root Metric: 10, Metric: 0
Not eligible, Reason: Primary next-hop link fate sharing
Root: camaro, Root Metric: 10, Metric: 20
track-item: olympic.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops
Root: glacier, Root Metric: 10, Metric: 20
track-item: olympic.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops

```

camaro.00

```

Primary next-hop: ae0.0, IPV4, camaro, SNPA: 0:90:69:f:67:f0
Primary next-hop: ae0.0, IPV6, camaro, SNPA: 0:90:69:f:67:f0
Root: camaro, Root Metric: 10, Metric: 0
Not eligible, Reason: Primary next-hop link fate sharing
Root: glacier, Root Metric: 10, Metric: 20
track-item: camaro.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops
Root: olympic, Root Metric: 10, Metric: 20
track-item: camaro.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops

```

glacier.00

```

Primary next-hop: as0.0, IPV4, glacier
Primary next-hop: as0.0, IPV6, glacier
Root: glacier, Root Metric: 10, Metric: 0
Not eligible, Reason: Primary next-hop link fate sharing
Root: camaro, Root Metric: 10, Metric: 20
track-item: glacier.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops
Root: olympic, Root Metric: 10, Metric: 20
track-item: glacier.00-00
track-item: kobuk.00-00
Not eligible, Reason: Path loops

```

3 nodes

## show isis context-identifier

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show isis context-identifier<br><brief   detail   extensive><br><identifier name><br><instance instance-name><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.4.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display IS-IS context identifier information.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <b>brief   detail   extensive</b> —(Optional) Display the specified level of output.<br><br><b>identifier name</b> —(Optional) Display information about the specified context identifier.<br><br><b>instance instance-name</b> —(Optional) Display entries for the specified routing instance.<br><br><b>logical-system (all   logical-system-name)</b> —(Optional) Display the context identifier information for all logical systems or for a particular logical system. |
| <b>Required Privilege Level</b> | View                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | Table 144 on page 1700 lists the output fields for the <b>show isis context-identifier</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                 |

Table 144: show isis context-identifier Output Fields

| Field Name | Field Description                                                                                                  | Level of Output |
|------------|--------------------------------------------------------------------------------------------------------------------|-----------------|
| Context    | IPv4 address that defines a protection pair. The context is manually configured on both primary and protector PEs. | detail          |
| Owner      | Protocol that requires the context.                                                                                | detail          |
| Role       | Role of the PE, which is either primary or protector.                                                              | detail          |
| Primary    | Name of the primary PE.                                                                                            | detail          |
| Metric     | Advertised interior gateway protocol (IGP) metric.                                                                 | detail          |

## Sample Output

```
user@host> show isis context-identifier detail
```

```
IS-IS context database:
```

```
Context Owner Role Primary Metric
2.2.4.3 MPLS Primary pro3-e 1
 Advertiser pro3-e, Router ID 10.255.245.198, Metric 1, Level 1
 Advertiser pro3-e, Router ID 10.255.245.198, Metric 1, Level 2
 Advertiser pro3-c, Router ID 10.255.245.196, Metric 11, Level 2
```



## show isis database

---

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1702</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1702</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                   | <pre>show isis database &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show isis database &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;level (1   2)&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                              | Display the entries in the Intermediate System-to-Intermediate System (IS-IS) link-state database, which contains data about PDU packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                                  | <p><b>none</b>—Display standard information about IS-IS link-state database entries for all routing instances.</p> <p><b><i>system id</i></b>—(Optional) Display IS-IS link-state database entries for the specified intermediate system.</p> <p><b><i>brief   detail   extensive</i></b>—(Optional) Display the specified level of output.</p> <p><b><i>instance instance-name</i></b>—(Optional) Display IS-IS link-state database entries for the specified routing instance.</p> <p><b><i>level (1   2)</i></b>—(Optional) Display IS-IS link-state database entries for the specified IS-IS level.</p> <p><b><i>logical-system (all   logical-system-name)</i></b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"><li>• <a href="#">clear isis database on page 1680</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>                    | <a href="#">show isis database on page 1704</a><br><a href="#">show isis database brief on page 1705</a><br><a href="#">show isis database detail on page 1705</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



[show isis database extensive on page 1705](#)

**Output Fields** [Table 145 on page 1703](#) describes the output fields for the **show isis database** command. Output fields are listed in the approximate order in which they appear. Fields that contain internal IS-IS information useful only in troubleshooting obscure problems are not described in the table. For more details about these fields, contact your customer support representative.

**Table 145: show isis database Output Fields**

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                            | Level of Output         |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Interface name</b> | Name of the interface on which the link-state PDU has been received; always <b>IS-IS</b> for this command.                                                                                                                                                                                                                                                                                   | All levels              |
| level                 | Level of intermediate system: <ul style="list-style-type: none"> <li>• <b>1</b>—Intermediate system routes within an area; when the destination is outside an area, it routes toward a Level 2 system.</li> <li>• <b>2</b>—Intermediate system routes between areas and toward other ASs.</li> </ul>                                                                                         | All levels              |
| LSP ID                | Link-state PDU identifier.                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| Sequence              | Sequence number of the link-state PDU.                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| Checksum              | Checksum value of the link-state PDU.                                                                                                                                                                                                                                                                                                                                                        | All levels              |
| Lifetime (secs)       | Remaining lifetime of the link-state PDU, in seconds.                                                                                                                                                                                                                                                                                                                                        | All levels              |
| Attributes            | Attributes of the specified database: <b>L1</b> , <b>L2</b> , <b>Overload</b> , or <b>Attached</b> (L1 only).                                                                                                                                                                                                                                                                                | none <b>brief</b>       |
| # LSPs                | Total number of link-state PDUs in the specified link-state database.                                                                                                                                                                                                                                                                                                                        | none <b>brief</b>       |
| IP prefix             | Prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| IS neighbor           | IS-IS neighbor of the advertising system.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| IP prefix             | IPv4 prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| V6 prefix             | IPv6 prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| Metric                | Metric of the prefix or neighbor.                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| Header                | <ul style="list-style-type: none"> <li>• <b>LSP ID</b>—Link state PDU identifier of the header.</li> <li>• <b>Length</b>—Header length.</li> <li>• <b>Allocated Length</b>—Amount of length available for the header.</li> <li>• <b>Router ID</b>—Address of the local routing device.</li> <li>• <b>Remaining Lifetime</b>—Remaining lifetime of the link-state PDU, in seconds.</li> </ul> | <b>extensive</b>        |

Table 145: show isis database Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Packet     | <ul style="list-style-type: none"> <li>• <b>LSP ID</b>—The identifier for the link-state PDU.</li> <li>• <b>Length</b>—Packet length.</li> <li>• <b>Lifetime</b>—Remaining lifetime, in seconds.</li> <li>• <b>Checksum</b>—The checksum of the link-state PDU.</li> <li>• <b>Sequence</b>—The sequence number of the link-state PDU. Every time the link-state PDU is updated, this number increments.</li> <li>• <b>Attributes</b>—Packet attributes.</li> <li>• <b>NLPID</b>—Network layer protocol identifier.</li> <li>• <b>Fixed length</b>—Specifies the set length for the packet.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                            | extensive       |
| TLVs       | <ul style="list-style-type: none"> <li>• <b>Area Address</b>—Area addresses that the routing device can reach.</li> <li>• <b>Speaks</b>—Supported routing protocols.</li> <li>• <b>IP router id</b>—ID of the routing device (usually the IP address).</li> <li>• <b>IP address</b>—IPv4 address.</li> <li>• <b>Hostname</b>—Assigned name of the routing device.</li> <li>• <b>IP prefix</b>—IP prefix of the routing device.</li> <li>• <b>Metric</b>—IS-IS metric that measures the cost of the adjacency between the originating routing device and the advertised routing device.</li> <li>• <b>IP extended prefix</b>—Extended IP prefix of the routing device.</li> <li>• <b>IS neighbor</b>—Directly attached neighbor's name and metric.</li> <li>• <b>IS extended neighbor</b>—Directly attached neighbor's name, metric, IP address, local interface index, and remote interface index.</li> </ul> <p>The interface indexes enable Junos OS to support unnumbered extensions for IS-IS, as described in RFC 4205.</p> | extensive       |

## Sample Output

### show isis database

```

user@host> show isis database
IS-IS level 1 link-state database:
LSP ID Sequence Checksum Lifetime Attributes
kobuk.00-00 0x3 0x3167 1057 L1 L2
camaro.00-00 0x5 0x770e 1091 L1 L2
ranier.00-00 0x4 0xaa95 1091 L1 L2
glacier.00-00 0x4 0x206f 1089 L1 L2
glacier.02-00 0x1 0xd141 1089 L1 L2
badlands.00-00 0x3 0x87a2 1093 L1 L2
 6 LSPs

IS-IS level 2 link-state database:
LSP ID Sequence Checksum Lifetime Attributes
kobuk.00-00 0x6 0x8d6b 1096 L1 L2
camaro.00-00 0x9 0x877b 1101 L1 L2
ranier.00-00 0x8 0x855d 1103 L1 L2
glacier.00-00 0x7 0xf892 1098 L1 L2
glacier.02-00 0x1 0xd141 1089 L1 L2
badlands.00-00 0x6 0x562 1105 L1 L2
 6 LSPs

```

### show isis database brief

The output for the **show isis database brief** command is identical to that for the **show isis database** command. For sample output, see [show isis database on page 1704](#).

### show isis database detail

```
user@host> show isis database logical-system CE3 sisira.00-00 detail
```

IS-IS level 1 link-state database:

```
sisira.00-00 Sequence: 0x11, Checksum: 0x10fc, Lifetime: 975 secs
 IS neighbor: hemantha-CE3.02 Metric: 10
 ES neighbor: 0015.0015.0015 Metric: 10 Down
 ES neighbor: 0025.0025.0025 Metric: 10 Down
 ES neighbor: 0030.0030.0030 Metric: 10 Down
 ES neighbor: 0040.0040.0040 Metric: 10 Down
 ES neighbor: sisira Metric: 0
 IP prefix: 1.0.0.0/24 Metric: 10 External Down
 IP prefix: 3.0.0.0/24 Metric: 10 External Down
 IP prefix: 4.0.0.0/24 Metric: 10 External Down
 IP prefix: 5.0.0.0/24 Metric: 10 Internal Up
 IP prefix: 15.15.15.15/32 Metric: 10 External Down
 IP prefix: 25.25.25.25/32 Metric: 10 External Down
 IP prefix: 30.30.30.30/32 Metric: 10 External Down
 IP prefix: 40.40.40.40/32 Metric: 10 External Down
 IP prefix: 60.60.60.60/32 Metric: 0 Internal Up
```

IS-IS level 2 link-state database:

```
sisira.00-00 Sequence: 0x13, Checksum: 0x69ac, Lifetime: 993 secs
 IS neighbor: hemantha-CE3.02 Metric: 10
 IP prefix: 1.0.0.0/24 Metric: 10 External Down
 IP prefix: 3.0.0.0/24 Metric: 10 External Down
 IP prefix: 4.0.0.0/24 Metric: 10 External Down
 IP prefix: 5.0.0.0/24 Metric: 10 Internal Up
 IP prefix: 15.15.15.15/32 Metric: 10 External Down
 IP prefix: 25.25.25.25/32 Metric: 10 External Down
 IP prefix: 30.30.30.30/32 Metric: 10 External Down
 IP prefix: 40.40.40.40/32 Metric: 10 External Down
 IP prefix: 50.50.50.50/32 Metric: 10 Internal Up
 IP prefix: 60.60.60.60/32 Metric: 0 Internal Up
 ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
 Metric: 10 External Down
 ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
 Metric: 10 External Down
 ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
 Metric: 10 External Down
 ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
 Metric: 10 External Down
 ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
 Metric: 0 Internal Up
```

### show isis database extensive

```
user@host> show isis database extensive
```

IS-IS level 1 link-state database:

```
sisira.00-00 Sequence: 0x11, Checksum: 0x10fc, Lifetime: 970 secs
```

```

IS neighbor: hemantha-CE3.02 Metric: 10
Two-way fragment: hemantha-CE3.02-00, Two-way first fragment:
hemantha-CE3.02-00
ES neighbor: 0015.0015.0015 Metric: 10 Down
ES neighbor: 0025.0025.0025 Metric: 10 Down
ES neighbor: 0030.0030.0030 Metric: 10 Down
ES neighbor: 0040.0040.0040 Metric: 10 Down
ES neighbor: sisira Metric: 0
IP prefix: 1.0.0.0/24 Metric: 10 External Down
IP prefix: 3.0.0.0/24 Metric: 10 External Down
IP prefix: 4.0.0.0/24 Metric: 10 External Down
IP prefix: 5.0.0.0/24 Metric: 10 Internal Up
IP prefix: 15.15.15.15/32 Metric: 10 External Down
IP prefix: 25.25.25.25/32 Metric: 10 External Down
IP prefix: 30.30.30.30/32 Metric: 10 External Down
IP prefix: 40.40.40.40/32 Metric: 10 External Down
IP prefix: 60.60.60.60/32 Metric: 0 Internal Up

```

```

Header: LSP ID: sisira.00-00, Length: 336 bytes
Allocated length: 336 bytes, Router ID: 0.0.0.0
Remaining lifetime: 970 secs, Level: 1, Interface: 333
Estimated free bytes: 144, Actual free bytes: 0
Aging timer expires in: 970 secs
Protocols: IP, IPv6, CLNS

```

```

Packet: LSP ID: sisira.00-00, Length: 336 bytes, Lifetime : 1198 secs
Checksum: 0x10fc, Sequence: 0x11, Attributes: 0xb L1 L2 Attached
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
Packet type: 18, Packet version: 1, Max area: 0

```

```

TLVs:
Area address: 60.0006.80ff.f800.0000.0108.0001 (13)
Speaks: IP
Speaks: IPV6
Speaks: CLNP
Hostname: sisira
ES neighbor TLV: Internal, Metric: default 0, Up
 ES: sisira
IS neighbor: hemantha-CE3.02, Internal, Metric: default 10
IS extended neighbor: hemantha-CE3.02, Metric: default 10
ES neighbor TLV: External, Metric: default 10, Down
 ES: 0040.0040.0040
ES neighbor TLV: External, Metric: default 10, Down
 ES: 0025.0025.0025
ES neighbor TLV: External, Metric: default 10, Down
 ES: 0015.0015.0015
ES neighbor TLV: External, Metric: default 10, Down
 ES: 0030.0030.0030
IP external prefix: 3.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 40.40.40.40/32, Internal, Metric: default 10, Down
IP external prefix: 4.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 25.25.25.25/32, Internal, Metric: default 10, Down
IP external prefix: 15.15.15.15/32, Internal, Metric: default 10, Down
IP external prefix: 30.30.30.30/32, Internal, Metric: default 10, Down
IP extended prefix: 3.0.0.0/24 metric 10 down
IP extended prefix: 40.40.40.40/32 metric 10 down
IP extended prefix: 4.0.0.0/24 metric 10 down
IP extended prefix: 25.25.25.25/32 metric 10 down
IP extended prefix: 15.15.15.15/32 metric 10 down
IP extended prefix: 1.0.0.0/24 metric 10 down

```

```

IP extended prefix: 30.30.30.30/32 metric 10 down
IP prefix: 60.60.60.60/32, Internal, Metric: default 0, Up
IP prefix: 5.0.0.0/24, Internal, Metric: default 10, Up
IP extended prefix: 60.60.60.60/32 metric 0 up
IP extended prefix: 5.0.0.0/24 metric 10 up
No queued transmissions

```

#### IS-IS level 2 link-state database:

```

sisira.00-00 Sequence: 0x13, Checksum: 0x69ac, Lifetime: 988 secs
IS neighbor: hemantha-CE3.02 Metric: 10
Two-way fragment: hemantha-CE3.02-00, Two-way first fragment:
hemantha-CE3.02-00
IP prefix: 1.0.0.0/24 Metric: 10 External Down
IP prefix: 3.0.0.0/24 Metric: 10 External Down
IP prefix: 4.0.0.0/24 Metric: 10 External Down
IP prefix: 5.0.0.0/24 Metric: 10 Internal Up
IP prefix: 15.15.15.15/32 Metric: 10 External Down
IP prefix: 25.25.25.25/32 Metric: 10 External Down
IP prefix: 30.30.30.30/32 Metric: 10 External Down
IP prefix: 40.40.40.40/32 Metric: 10 External Down
IP prefix: 50.50.50.50/32 Metric: 10 Internal Up
IP prefix: 60.60.60.60/32 Metric: 0 Internal Up
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
Metric: 0 Internal Up

```

```

Header: LSP ID: sisira.00-00, Length: 427 bytes
Allocated length: 427 bytes, Router ID: 0.0.0.0
Remaining lifetime: 988 secs, Level: 2, Interface: 333
Estimated free bytes: 130, Actual free bytes: 0
Aging timer expires in: 988 secs
Protocols: IP, IPv6, CLNS

```

```

Packet: LSP ID: sisira.00-00, Length: 427 bytes, Lifetime : 1198 secs
Checksum: 0x69ac, Sequence: 0x13, Attributes: 0x3 L1 L2
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
Packet type: 20, Packet version: 1, Max area: 0

```

#### TLVs:

```

Area address: 60.0006.80ff.f800.0000.0108.0001 (13)
Speaks: IP
Speaks: IPV6
Speaks: CLNP
Hostname: sisira
IS neighbor: hemantha-CE3.02, Internal, Metric: default 10
IS extended neighbor: hemantha-CE3.02, Metric: default 10
IP external prefix: 3.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 40.40.40.40/32, Internal, Metric: default 10, Down
IP external prefix: 4.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 25.25.25.25/32, Internal, Metric: default 10, Down
IP external prefix: 15.15.15.15/32, Internal, Metric: default 10, Down
IP external prefix: 1.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 30.30.30.30/32, Internal, Metric: default 10, Down

```

```

IP extended prefix: 3.0.0.0/24 metric 10 down
IP extended prefix: 40.40.40.40/32 metric 10 down
IP extended prefix: 4.0.0.0/24 metric 10 down
IP extended prefix: 25.25.25.25/32 metric 10 down
IP extended prefix: 15.15.15.15/32 metric 10 down
IP extended prefix: 1.0.0.0/24 metric 10 down
IP extended prefix: 30.30.30.30/32 metric 10 down
ISO prefix-neighbor TLV: Internal, Metric: default 0, Up
 Prefix : 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
 Prefix : 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
 Prefix : 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
 Prefix : 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
 Prefix : 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
IP prefix: 60.60.60.60/32, Internal, Metric: default 0, Up
IP prefix: 5.0.0.0/24, Internal, Metric: default 10, Up
IP prefix: 50.50.50.50/32, Internal, Metric: default 10, Up
IP extended prefix: 60.60.60.60/32 metric 0 up
IP extended prefix: 5.0.0.0/24 metric 10 up
IP extended prefix: 50.50.50.50/32 metric 10 up
No queued transmissions

```

```

Router-F.02-00 Sequence: 0x1, Checksum: 0xf5ae, Lifetime: 1153 secs
IS neighbor: Router-E.00 Metric: 0
 Two-way fragment: Router-E.00-00, Two-way first fragment: Router-E.00-00
IS neighbor: Router-F.00 Metric: 0
 Two-way fragment: Router-F.00-00, Two-way first fragment: Router-F.00-00

```

```

Header: LSP ID: Router-F.02-00, Length: 76 bytes
Allocated length: 284 bytes, Router ID: 0.0.0.0
Remaining lifetime: 1153 secs, Level: 2, Interface: 101
Estimated free bytes: 208, Actual free bytes: 208
Aging timer expires in: 1153 secs

```

```

Packet: LSP ID: Router-F.02-00, Length: 76 bytes, Lifetime : 1183 secs
Checksum: 0xf5ae, Sequence: 0x1, Attributes: 0x3 <L1 L2>
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
Packet type: 20, Packet version: 1, Max area: 0

```

```

TLVs:
IS neighbor: Router-F.00, Internal, Metric: default 0
IS neighbor: Router-E.00, Internal, Metric: default 0
IS extended neighbor: Router-F.00, Metric: default 0
IS extended neighbor: Router-E.00, Metric: default 0
No queued transmissions

```

## show isis hostname

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1709</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1709</a>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                     | <pre>show isis hostname &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switches and QFX Series)</b> | show isis hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                             |
| <b>Description</b>                                | <p>Display IS-IS hostname database information.</p> <p>This command displays the system ID-to-name cache. The output shows if the mapping has been learned by receipt of a Hostname TLV #137 (type dynamic) configured in Junos OS with the <b>set system host-name</b> command, or a static mapping defined in Junos OS with the <b>set system static-host-mapping <i>hostname</i> sysid</b> command (type static). The local router always has its type set to static even if <b>static-host-mapping</b> is not configured.</p> |
| <b>Options</b>                                    | <p><b>none</b>—Display IS-IS hostname database information.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                      | <a href="#">show isis hostname on page 1710</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>                              | <p><a href="#">Table 146 on page 1709</a> describes the output fields for the <b>show isis hostname</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                      |

**Table 146: show isis hostname Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                       |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System Id</b> | System identifier mapped to the hostname.                                                                                                                                                                                                                                                               |
| <b>Hostname</b>  | Hostname mapped to the system identifier.                                                                                                                                                                                                                                                               |
| <b>Type</b>      | <p>Type of mapping between system identifier and hostname.</p> <ul style="list-style-type: none"> <li><b>Dynamic</b>—Hostname mapping determined as described in RFC 2763, <i>Dynamic Hostname Exchange Mechanism for IS-IS</i>.</li> <li><b>Static</b>—Hostname mapping configured by user.</li> </ul> |

## Sample Output

show isis hostname

```
user@host> show isis hostname
IS-IS hostname database:
System Id Hostname
1921.6800.4201 isis1
1921.6800.4202 isis2
1921.6800.4203 isis3
```

| Type    |
|---------|
| Dynamic |
| Static  |
| Dynamic |



## show isis interface

**List of Syntax**    [Syntax on page 1711](#)  
                          [Syntax \(EX Series Switches and QFX Series\) on page 1711](#)

**Syntax**    show isis interface  
                  <brief | detail | extensive>  
                  <interface-name>  
                  <logical-system (all | *logical-system-name*)>

**Syntax (EX Series Switches and QFX Series)**    show isis interface  
                  <brief | detail | extensive>  
                  <interface-name>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                  Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                  Command introduced in Junos OS Release 12.1 for the QFX Series.

**Description**    Display status information about IS-IS-enabled interfaces.



**NOTE:** If the configured metric for an IS-IS level is above 63, and the **wide-metrics-only** statement is not configured, the **show isis interface detail** command and the **show isis interface extensive** command display 63 as the metric value for that level. Configure the **wide-metrics-only** statement to generate metric values greater than 63 on a per IS-IS level basis.

The **show isis interface** command displays the configured metric value for an IS-IS level irrespective of whether is configured or not.

**Options**    **none**—Display standard information about all IS-IS-enabled interfaces.  
                  **brief | detail | extensive**—(Optional) Display the specified level of output.  
                  **interface-name**—(Optional) Display information about the specified interface only.  
                  **logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**Required Privilege Level**    view

**Related Documentation**    • *Understanding Wide IS-IS Metrics for Traffic Engineering*  
                                      • *Example: Enabling Wide IS-IS Metrics for Traffic Engineering*

**List of Sample Output**    [show isis interface on page 1714](#)  
                                      [show isis interface brief on page 1714](#)  
                                      [show isis interface detail on page 1714](#)

[show isis interface extensive on page 1714](#)

**Output Fields** [Table 147 on page 1712](#) describes the output fields for the **show isis interface** command. Output fields are listed in the approximate order in which they appear.

**Table 147: show isis interface Output Fields**

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                     | Level of Output         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>interface-name</i>    | Name of the interface.                                                                                                                                                                                                                                                                                                                                                | <b>detail</b>           |
| <b>Designated router</b> | Routing device selected by other routers that is responsible for sending link-state advertisements that describe the network. Used only on broadcast networks.                                                                                                                                                                                                        | <b>detail</b>           |
| <b>Index</b>             | Interface index assigned by the Junos OS kernel.                                                                                                                                                                                                                                                                                                                      | <b>detail</b>           |
| <b>State</b>             | Internal implementation information.                                                                                                                                                                                                                                                                                                                                  | <b>detail</b>           |
| <b>Circuit id</b>        | Circuit identifier.<br><br><b>NOTE:</b> Each IS-IS interface is assigned a circuit ID value to identify the interface within the linkstate database. All interfaces (loopback, broadcast, and so on) and all point-to-point links share the locally significant value of 0x01, and this value is not incremented.                                                     | <b>detail</b>           |
| <b>Circuit type</b>      | Circuit type: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul>                                                                                                                                                                                                                           | <b>detail</b>           |
| <b>LSP interval</b>      | Interval between link-state PDUs sent from the interface.                                                                                                                                                                                                                                                                                                             | <b>detail</b>           |
| <b>CSNP interval</b>     | Interval between complete sequence number PDUs sent from the interface.                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Sysid</b>             | System identifier.                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>           |
| <b>Interface</b>         | Interface through which the adjacency is made.                                                                                                                                                                                                                                                                                                                        | <b>none brief</b>       |
| <b>L or Level</b>        | Level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> <b>NOTE:</b> The default IS-IS level on loopback interfaces are always same as the IS-IS level configured on other IS-IS interfaces in a router. You can also configure IS-IS level on loopback interfaces per your requirement. | All levels              |
| <b>CirID</b>             | Circuit identifier.                                                                                                                                                                                                                                                                                                                                                   | <b>none brief</b>       |
| <b>Level 1 DR</b>        | Level 1 designated intermediate system.                                                                                                                                                                                                                                                                                                                               | <b>none brief</b>       |
| <b>Level 2 DR</b>        | Level 2 designated intermediate system.                                                                                                                                                                                                                                                                                                                               | <b>none brief</b>       |

Table 147: show isis interface Output Fields (*continued*)

| Field Name                                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output         |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>L1/L2 Metric</b>                       | Interface's metric for Level 1 and Level 2. If there is no information, the metric is 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | none <b>brief</b>       |
| <b>Adjacency advertisement: Advertise</b> | This routing device has signaled to advertise this interface to its neighbors in their label-switched paths (LSPs).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Adjacency advertisement: Suppress</b>  | This neighbor has signaled not to advertise this interface in the routing device's outbound LSPs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |
| <b>Adjacencies</b>                        | Number of adjacencies established on this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail</b>           |
| <b>Priority</b>                           | Priority value for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail</b>           |
| <b>Metric</b>                             | Metric value for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b>           |
| <b>Hello(s) / Hello Interval</b>          | Interface's hello interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Hold(s) / Hold Time</b>                | Interface's hold time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Designated Router</b>                  | Router responsible for sending network link-state advertisements, which describe all the routing devices attached to the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail</b>           |
| <b>Hello padding</b>                      | Type of hello padding: <ul style="list-style-type: none"> <li>• <b>Adaptive</b>—On point-to-point connections, the hello packets are padded from the initial detection of a new neighbor until the neighbor verifies the adjacency as Up in the adjacency state TLV. If the neighbor does not support the adjacency state TLV, then padding continues. On LAN connections, padding starts from the initial detection of a new neighbor until there is at least one active adjacency on the interface.</li> <li>• <b>Loose</b>—(Default) The hello packet is padded from the initial detection of a new neighbor until the adjacency transitions to the Up state.</li> <li>• <b>Strict</b>—Padding is performed on all interface types and for all adjacency states, and is continuous.</li> </ul> | <b>extensive</b>        |
| <b>LDP sync state</b>                     | Current LDP synchronization state: <b>in sync</b> , <b>in holddown</b> , or <b>not supported</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>        |
| <b>reason</b>                             | Reason for being in the LDP sync state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |
| <b>config holdtime</b>                    | Configured value of the hold timer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>        |
| <b>remaining</b>                          | If the state is not in sync and the hold time is not infinity, then this field displays the remaining hold time in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>        |

## Sample Output

### show isis interface

```
user@host> show isis interface
IS-IS interface database:
Interface L CirID Level 1 DR Level 2 DR L1/L2 Metric
at-2/3/0.0 3 0x1 Point to Point Point to Point 10/10
lo0.0 3 0x1 Passive Passive 0/0
```

### show isis interface brief

The output for the **show isis interface brief** command is identical to that for the **show isis interface** command. For sample output, see [show isis interface on page 1714](#).

### show isis interface detail

```
user@host> show isis interface detail
IS-IS interface database:
at-2/3/0.0
 Index: 66, State: 0x6, Circuit id: 0x1, Circuit type: 3
 LSP interval: 100 ms, CSNP interval: 5 s
 Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
 1 1 64 10 9.000 27
 2 1 64 10 9.000 27
lo0.0
 Index: 64, State: 0x6, Circuit id: 0x1, Circuit type: 0
 LSP interval: 100 ms, CSNP interval: disabled
 Adjacency advertisement: Advertise
 Protection Type: Node Link, No eligible Backup
 Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
 1 0 64 0 Passive
 2 0 64 0 Passive
```

### show isis interface extensive

```
user@host> show isis interface extensive
IS-IS interface database:
xe-6/1/0.0
 Index: 75, State: 0x6, Circuit id: 0x1, Circuit type: 2
 LSP interval: 100 ms, CSNP interval: 10 s, Loose Hello padding
 Adjacency advertisement: Advertise
 Level 1
 Adjacencies: 0, Priority: 64, Metric: 10
 Disabled
 Level 2
 Adjacencies: 1, Priority: 64, Metric: 10
 Hello Interval: 20.000 s, Hold Time: 60 s
 Designated Router: nemean.03
```

## show isis overview

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <b>show isis overview</b><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <b>show isis overview</b><br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                        | Command introduced in Junos OS Release 8.5.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                  |
| <b>Description</b>                                | Display IS-IS overview information.                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                    | <b>none</b> —Display standard overview information about IS-IS for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display overview information for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>                      | <a href="#">show isis overview on page 1717</a>                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>                              | <a href="#">Table 148 on page 1715</a> lists the output fields for the <b>show isis overview</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                               |

**Table 148: show isis overview Output Fields**

| Field Name         | Field Description                                                  |
|--------------------|--------------------------------------------------------------------|
| Hostname           | Name of the router.                                                |
| Sysid              | Part of the ISO address of the routing device.                     |
| Areaid             | The area number of the routing device.                             |
| Instance           | IS-IS routing instance.                                            |
| Router ID          | Router ID of the routing device.                                   |
| Adjacency holddown | Adjacency holddown capability: <b>enabled</b> or <b>disabled</b> . |
| Maximum Areas      | Maximum number of IS-IS areas advertised by the routing device.    |
| LSP life time      | Lifetime of the link-state PDU, in seconds.                        |

Table 148: show isis overview Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                        |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Attached bit evaluation        | Attached bit capability: <b>enabled</b> or <b>disabled</b> .                                                             |
| SPF delay                      | Delay before performing consecutive shortest-path-first (SPF) calculations.                                              |
| SPF holddown                   | Delay before performing additional SPF calculations after the maximum number of consecutive SPF calculations is reached. |
| SPF rapid runs                 | Maximum number of SPF calculations that can be performed in succession before the holddown timer begins.                 |
| Overload bit at startup is set | Overload bit capability is enabled.                                                                                      |
| Overload high metrics          | Overload high metrics capability: <b>enabled</b> or <b>disabled</b> .                                                    |
| Overload timeout               | Time period after which overload is reset and the time that remains before the timer is set to expire.                   |
| Traffic engineering            | Traffic engineering capability: <b>enabled</b> or <b>disabled</b> .                                                      |
| Restart                        | Graceful restart capability: <b>enabled</b> or <b>disabled</b> .                                                         |
| Restart duration               | Time period for complete reacquisition of IS-IS neighbors.                                                               |
| Helper mode                    | Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .                                                  |
| Level                          | IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 information</li> <li>• 2—Level 2 information</li> </ul>  |
| IPv4 is enabled                | IP Protocol version 4 capability is enabled.                                                                             |
| IPv6 is enabled                | IP Protocol version 6 capability is enabled.                                                                             |
| Internal route preference      | Preference value of internal routes.                                                                                     |
| External route preference      | Preference value of external routes.                                                                                     |
| Prefix export limit            | Number of prefixes allowed to be exported, as configured by the <b>prefix-export-limit</b> statement.                    |
| Prefix export count            | Number of prefixes exported.                                                                                             |
| Wide area metrics are enabled  | Wide area metrics capability is enabled.                                                                                 |

Table 148: show isis overview Output Fields (*continued*)

| Field Name                   | Field Description                                                               |
|------------------------------|---------------------------------------------------------------------------------|
| Narrow metrics are enabled   | Narrow metrics capability is enabled.                                           |
| Adjacency holddown is active | IS-IS adjacencies come up one after another when adjacency holddown is enabled. |

## Sample Output

### show isis overview

```

user@host> show isis overview
Instance: master
Router ID: 10.255.107.183
Hostname: pro-bng3-a
Sysid: 0192.0168.0001
Areaid: 49.0002
Adjacency holddown: enabled
Maximum Areas: 3
LSP life time: 1200
Attached bit evaluation: enabled
SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
IPv4 is enabled, IPv6 is enabled
Traffic engineering: enabled
Restart: Disabled
 Helper mode: Enabled
Level 1
 Internal route preference: 15
 External route preference: 160
 Wide metrics are enabled, Narrow metrics are enabled
 Adjacency holddown is active
Level 2
 Internal route preference: 18
 External route preference: 165
 Prefix export limit: 5, Prefix export count: 5
 Wide metrics are enabled
 Adjacency holddown is active

```

```

user@host> show isis overview logical-system R2
Instance: master
Router ID: 192.168.0.2
Hostname: pro-bng3-a-R2
Sysid: 0192.0168.0002
Areaid: 49.0002
Adjacency holddown: enabled
Maximum Areas: 3
LSP life time: 1200
Attached bit evaluation: enabled
SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
IPv4 is enabled, IPv6 is enabled
Traffic engineering: enabled
Restart: Disabled
 Helper mode: Enabled
Level 1
 Internal route preference: 15
 External route preference: 160

```

```

 Prefix export count: 0
 Wide metrics are enabled, Narrow metrics are enabled
Level 2
 Internal route preference: 18
 External route preference: 165
 Prefix export count: 0
 Wide metrics are enabled, Narrow metrics are enabled

user@host> show isis overview logical-system R3
Instance: master
 Router ID: 192.168.0.3
 Hostname: pro-bng3-a-R3
 Sysid: 0192.0168.0003
 Areaid: 49.0002
 Adjacency holddown: enabled
 Maximum Areas: 3
 LSP life time: 1200
 Attached bit evaluation: enabled
 SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
 IPv4 is enabled, IPv6 is enabled
 Traffic engineering: enabled
 Restart: Disabled
 Helper mode: Enabled
Level 1
 Internal route preference: 15
 External route preference: 160
 Prefix export count: 0
 Wide metrics are enabled, Narrow metrics are enabled
Level 2
 Internal route preference: 18
 External route preference: 165
 Prefix export count: 0
 Wide metrics are enabled, Narrow metrics are enabled

```



## show isis route

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1719</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1719</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>                                     | <pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                                | Display the routes in the IS-IS routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                    | <p><b>none</b>—Display all routes in the IS-IS routing table for all supported address families for all routing instances.</p> <p><b><i>destination</i></b>—(Optional) Destination address for the route.</p> <p><b>inet   inet6</b>—(Optional) Display inet (IPv4) or inet6 (IPv6) routes, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display routes for the specified routing instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display routes for the specified topology only, or use unicast to display information, if available, for both IPv4 and IPv6 unicast topologies.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>                      | <a href="#">show isis route logical-system on page 1720</a><br><a href="#">show isis route (CLNS) on page 1720</a><br><a href="#">show isis route on page 1721</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>                              | <p><a href="#">Table 149 on page 1720</a> describes the output fields for the <b>show isis route</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 149: show isis route Output Fields

| Field Name             | Field Description                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current version</b> | Number of the current version of the IS-IS routing table.                                                                                  |
| <b>L1</b>              | Version of Level 1 SPF that was run.                                                                                                       |
| <b>L2</b>              | Version of Level 2 SPF that was run.                                                                                                       |
| <b>Prefix</b>          | Destination of the route.                                                                                                                  |
| <b>L</b>               | IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> |
| <b>Version</b>         | Version of SPF that generated the route.                                                                                                   |
| <b>Metric</b>          | Metric value associated with the route.                                                                                                    |
| <b>Type</b>            | Metric type: <b>int</b> (internal) or <b>ext</b> (external).                                                                               |
| <b>Interface</b>       | Interface to the next hop.                                                                                                                 |
| <b>Via</b>             | System identifier of the next hop, displayed as a name if possible.                                                                        |
| <b>ISO Routes</b>      | ISO routing table entries.                                                                                                                 |
| <b>snpa</b>            | MAC address.                                                                                                                               |

## Sample Output

### show isis route logical-system

```

user@host> show isis route logical-system ls1
IS-IS routing table Current version: L1: 8 L2: 11
Prefix L Version Metric Type Interface Via
10.9.7.0/30 2 11 20 int gr-0/2/0.0 h
10.9.201.1/32 2 11 60 int gr-0/2/0.0 h
IPv6 Unicast IS-IS routing table Current version: L1: 9 L2: 11
Prefix L Version Metric Type Interface Via
8009:3::a09:3200/126 2 11 20 int gr-0/2/0.0 h

```

### show isis route (CLNS)

```

user@host> show isis route
IS-IS routing table Current version: L1: 10 L2: 8
IPv4/IPv6 Routes
Prefix L Version Metric Type Interface Via
0.0.0.0/0 1 10 10 int fe-0/0/1.0 ISIS.0
ISO Routes
Prefix L Version Metric Type Interface Via snpa

```

```

0/0
 1 10 10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001/104
 1 10 0 int
47.0005.80ff.f800.0000.0108.0001.1921.6800.4001/152
 1 10 10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001.1921.6800.4002/152
 1 10 20 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0002/104
 1 10 0 int
47.0005.80ff.f800.0000.0108.0002.1921.6800.4001/152
 1 10 10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56

```

### show isis route

```
user@host> show isis route
```

```

IS-IS routing table Current version: L1: 4 L2: 13
IPv4/IPv6 Routes

Prefix L Version Metric Type Interface NH Via
10.255.71.52/32 2 13 10 int ae0.0 IPV4 camaro
10.255.71.238/32 2 13 20 int so-6/0/0.0 IPV4 olympic
 as0.0 IPV4 glacier
10.255.71.239/32 2 13 20 int so-6/0/0.0 IPV4 olympic
 ae0.0 IPV4 camaro
10.255.71.242/32 2 13 10 int as0.0 IPV4 glacier
10.255.71.243/32 2 13 10 int so-6/0/0.0 IPV4 olympic
12.13.0.0/30 2 13 20 int so-6/0/0.0 IPV4 olympic
12.15.0.0/30 2 13 20 int so-6/0/0.0 IPV4 olympic
13.15.0.0/30 2 13 30 int ae0.0 IPV4 camaro
 so-6/0/0.0 IPV4 olympic
 as0.0 IPV4 glacier
13.16.0.0/30 2 13 25 int as0.0 IPV4 glacier
14.15.0.0/30 2 13 20 int ae0.0 IPV4 camaro
192.2.1.0/30 2 13 30 int so-6/0/0.0 IPV4 olympic
 as0.0 IPV4 glacier
1eee::/64 2 13 30 int so-6/0/0.0 IPV6 olympic
 as0.0 IPV6 glacier
abcd::10:255:71:52/128 2 13 10 int ae0.0 IPV6 camaro
abcd::10:255:71:238/128 2 13 20 int so-6/0/0.0 IPV6 olympic

```

|                         |   |    |    |     |            |              |
|-------------------------|---|----|----|-----|------------|--------------|
|                         |   |    |    |     | as0.0      | IPV6 glacier |
| abcd::10:255:71:239/128 | 2 | 13 | 20 | int | so-6/0/0.0 | IPV6 olympic |
|                         |   |    |    |     | ae0.0      | IPV6 camaro  |
| abcd::10:255:71:242/128 | 2 | 13 | 10 | int | as0.0      | IPV6 glacier |
| abcd::10:255:71:243/128 | 2 | 13 | 10 | int | so-6/0/0.0 | IPV6 olympic |

## show isis spf

**List of Syntax** [Syntax on page 1723](#)  
[Syntax \(EX Series Switches\) on page 1723](#)

**Syntax** show isis spf (brief | log | results)  
 <instance *instance-name*>  
 <level (1 | 2)>  
 <logical-system (all | *logical-system-name*)>  
 <topology (ipv4-multicast | ipv6-multicast | ipv6-unicast | unicast)>

**Syntax (EX Series Switches)** show isis spf (brief | log | results)  
 <instance *instance-name*>  
 <level (1 | 2)>  
 <topology (ipv4-multicast | ipv6-multicast | ipv6-unicast | unicast)>

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.

**Description** Display information about IS-IS shortest-path-first (SPF) calculations.

**Options** **brief**—Display an overview of SPF calculations.

**instance *instance instance-name***—(Optional) Display SPF calculations for the specified routing instance.

**level (1 | 2)**—(Optional) Display SPF calculations for the specified IS-IS level.

**log**—Display the log of SPF calculations.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**results**—Display the results of SPF calculations.

**topology (ipv4-multicast | ipv6-multicast | ipv6-unicast | unicast)**—(Optional) Display SPF calculations for the specified topology only.

**Required Privilege Level** view

**List of Sample Output** [show isis spf log on page 1724](#)  
[show isis spf results logical-system on page 1725](#)  
[show isis spf results \(CLNS\) on page 1726](#)

**Output Fields** [Table 150 on page 1723](#) describes the output fields for the **show isis spf** command. Output fields are listed in the approximate order in which they appear.

**Table 150: show isis spf Output Fields**

| Field Name | Field Description    |
|------------|----------------------|
| Node       | System ID of a node. |

Table 150: show isis spf Output Fields (*continued*)

| Field Name     | Field Description                                                                       |
|----------------|-----------------------------------------------------------------------------------------|
| Metric         | Metric to the node.                                                                     |
| Interface      | Interface of the next hop.                                                              |
| Via            | System ID of the next hop.                                                              |
| SNPA           | Subnetwork point of attachment (MAC address of the next hop).                           |
| Start time     | (log option only) Time that the SPF computation started.                                |
| Elapsed (secs) | (log option only) Length of time, in seconds, required to complete the SPF computation. |
| Count          | (log option only) Number of times the SPF was triggered.                                |
| Reason         | (log option only) Reason that the SPF computation was completed.                        |

## Sample Output

### show isis spf log

```

user@host> show isis spf log logical-system lsl
IS-IS level 1 SPF log:
Start time Elapsed (secs) Count Reason
Fri Oct 31 12:41:18 0.000069 1 Reconfig
Fri Oct 31 12:41:18 0.000107 3 Updated LSP fix.00-00
Fri Oct 31 12:41:18 0.000050 3 Address change on so-1/2/2.0
Fri Oct 31 12:41:23 0.000033 1 Updated LSP fix.00-00
Fri Oct 31 12:41:28 0.000178 5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59 0.000060 1 Updated LSP fix.00-00
Fri Oct 31 12:42:30 0.000161 2 Multi area attachment change
Fri Oct 31 12:56:58 0.000198 1 Periodic SPF
Fri Oct 31 13:10:29 0.000209 1 Periodic SPF
IS-IS level 2 SPF log:
Start time Elapsed (secs) Count Reason
Fri Oct 31 12:41:18 0.000035 1 Reconfig
Fri Oct 31 12:41:18 0.000047 2 Updated LSP fix.00-00
Fri Oct 31 12:41:18 0.000043 5 Address change on gr-0/2/0.0
Fri Oct 31 12:41:23 0.000022 1 Updated LSP fix.00-00
Fri Oct 31 12:41:59 0.000144 3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30 0.000257 3 New LSP skag.00-00
Fri Oct 31 12:54:37 0.000195 1 Periodic SPF
Fri Oct 31 12:55:50 0.000178 1 Updated LSP fix.00-00
Fri Oct 31 12:55:55 0.000174 1 Updated LSP h.00-00
Fri Oct 31 12:55:58 0.000176 1 Updated LSP skag.00-00
Fri Oct 31 13:08:14 0.000198 1 Periodic SPF
IPv6 Unicast IS-IS level 1 SPF log:
Start time Elapsed (secs) Count Reason
Fri Oct 31 12:41:18 0.000028 1 Reconfig
Fri Oct 31 12:41:18 0.000043 3 Updated LSP fix.00-00

```

```

Fri Oct 31 12:41:18 0.000112 4 Updated LSP fix.00-00
Fri Oct 31 12:41:23 0.000059 1 Updated LSP fix.00-00
Fri Oct 31 12:41:25 0.000041 1 Updated LSP fix.00-00
Fri Oct 31 12:41:28 0.000103 5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59 0.000040 1 Updated LSP fix.00-00
Fri Oct 31 12:42:30 0.000118 2 Multi area attachment change
Fri Oct 31 12:56:08 0.000289 1 Periodic SPF
Fri Oct 31 13:11:07 0.000214 1 Periodic SPF
IPV6 Unicast IS-IS level 2 SPF log:

```

```

Start time Elapsed (secs) Count Reason
Fri Oct 31 12:41:18 0.000027 1 Reconfig
Fri Oct 31 12:41:18 0.000039 2 Updated LSP fix.00-00
Fri Oct 31 12:41:18 0.000049 6 Updated LSP fix.00-00
Fri Oct 31 12:41:23 0.000025 1 Updated LSP fix.00-00
Fri Oct 31 12:41:25 0.000023 1 Updated LSP fix.00-00
Fri Oct 31 12:41:59 0.000087 3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30 0.000123 3 New LSP skag.00-00
Fri Oct 31 12:55:50 0.000121 1 Updated LSP fix.00-00
Fri Oct 31 12:55:55 0.000121 1 Updated LSP h.00-00
Fri Oct 31 12:55:58 0.000121 1 Updated LSP skag.00-00
Fri Oct 31 13:09:46 0.000201 1 Periodic SPF
...

```

#### show isis spf results logical-system

```
user@host> show isis spf results logical-system ls1
```

```
IS-IS level 1 SPF results:
```

| Node    | Metric | Interface     | Via  | SNPA             |
|---------|--------|---------------|------|------------------|
| scat.00 | 10     | ge-1/1/0.0    | scat | 0:90:69:a6:48:9d |
|         | 20     | 10.9.1.0/30   |      |                  |
| fix.02  | 10     |               |      |                  |
| fix.00  | 0      |               |      |                  |
|         | 10     | 10.9.1.0/30   |      |                  |
|         | 10     | 10.9.5.0/30   |      |                  |
|         | 10     | 10.9.6.0/30   |      |                  |
|         | 20     | 10.9.7.0/30   |      |                  |
|         | 60     | 10.9.201.1/32 |      |                  |
| 3 nodes |        |               |      |                  |

```
IS-IS level 2 SPF results:
```

| Node    | Metric | Interface     | Via | SNPA |
|---------|--------|---------------|-----|------|
| skag.00 | 20     | gr-0/2/0.0    | h   |      |
|         | 30     | 10.9.7.0/30   |     |      |
| skag.02 | 20     | gr-0/2/0.0    | h   |      |
| h.00    | 10     | gr-0/2/0.0    | h   |      |
|         | 20     | 10.9.6.0/30   |     |      |
|         | 20     | 10.9.7.0/30   |     |      |
|         | 60     | 10.9.201.1/32 |     |      |
| fix.00  | 0      |               |     |      |
|         | 10     | 10.9.1.0/30   |     |      |
|         | 10     | 10.9.5.0/30   |     |      |
|         | 10     | 10.9.6.0/30   |     |      |
| 4 nodes |        |               |     |      |

```
IPV6 Unicast IS-IS level 1 SPF results:
```

| Node    | Metric | Interface            | Via  | SNPA             |
|---------|--------|----------------------|------|------------------|
| scat.00 | 10     | ge-1/1/0.0           | scat | 0:90:69:a6:48:9d |
|         |        | ge-1/1/0.0           | scat | 0:90:69:a6:48:9d |
|         | 20     | 8009:1::a09:1400/126 |      |                  |
| fix.02  | 10     |                      |      |                  |

```

fix.00 0
 10 8009:1::a09:1400/126
 10 8009:2::a09:1e00/126
 20 8009:3::a09:3200/126
 10 8009:4::a09:2800/126
3 nodes

IPv6 Unicast IS-IS level 2 SPF results:
Node Metric Interface Via SNPA
skag.00 20 gr-0/2/0.0 h
 30 8009:3::a09:3200/126
skag.02 20 gr-0/2/0.0 h
 20 gr-0/2/0.0 h
h.00 10 gr-0/2/0.0 h
 20 gr-0/2/0.0 h
 20 8009:3::a09:3200/126
 20 8009:4::a09:2800/126
fix.00 0
 10 8009:1::a09:1400/126
 10 8009:2::a09:1e00/126
 10 8009:4::a09:2800/126
4 nodes

Multicast IS-IS level 1 SPF results:
Node Metric Interface Via SNPA
scat.00 10 ge-1/1/0.0 scat 0:90:69:a6:48:9d
fix.02 10
fix.00 0
3 nodes

Multicast IS-IS level 2 SPF results:
Node Metric Interface Via SNPA
skag.00 20 gr-0/2/0.0 h
skag.02 20 gr-0/2/0.0 h
h.00 10 gr-0/2/0.0 h
fix.00 0
4 nodes
...

```

**show isis spf results (CLNS)**

```

user@host> show isis spf results
IS-IS level 1 SPF results:
Node Metric Interface Via SNPA
skag.00 10 fe-0/0/1.0 toothache 0:12:0:34:0:56
 20 fe-0/0/1.0 toothache 0:12:0:34:0:56
 20 192.168.37.64/29
 10 1921.6800.4001
 20 1921.6800.4002
pro1-a.02 10
pro1-a.00 0
 0 10.255.245.1/32
 10 192.168.37.64/29
 0 1921.6800.4211
3 nodes

IS-IS level 2 SPF results:
Node Metric Interface Via SNPA
skag.00 10 fe-0/0/1.0 toothache 0:12:0:34:0:56
 0 fe-0/0/1.0 toothache 0:12:0:34:0:56

```



|           |    |                                      |
|-----------|----|--------------------------------------|
|           | 20 | 10.255.245.1/32                      |
|           | 20 | 192.168.37.64/29                     |
|           | 20 | 47.0005.80ff.f800.0000.0109.0010/104 |
| pro1-a.02 | 10 |                                      |
| pro1-a.00 | 0  |                                      |
|           | 0  | 10.255.245.1/32                      |
|           | 10 | 192.168.37.64/29                     |
| 3 nodes   |    |                                      |

## show isis statistics

---

|                                            |                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                             | <a href="#">Syntax on page 1728</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1728</a>                                                                                                                                                                                                                                       |
| Syntax                                     | show isis statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                     |
| Syntax (EX Series Switches and QFX Series) | show isis statistics<br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                             |
| Release Information                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                   |
| Description                                | Display statistics about IS-IS traffic.                                                                                                                                                                                                                                                                                                              |
| Options                                    | <b>none</b> —Display IS-IS traffic statistics for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display statistics for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| Required Privilege Level                   | view                                                                                                                                                                                                                                                                                                                                                 |
| Related Documentation                      | <ul style="list-style-type: none"><li>• <a href="#">clear isis statistics on page 1684</a></li></ul>                                                                                                                                                                                                                                                 |
| List of Sample Output                      | <a href="#">show isis statistics on page 1730</a>                                                                                                                                                                                                                                                                                                    |
| Output Fields                              | <a href="#">Table 151 on page 1729</a> describes the output fields for the <b>show isis statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                              |

Table 151: show isis statistics Output Fields

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PDU type                    | <p>PDU type:</p> <ul style="list-style-type: none"> <li>• <b>CSNP</b>—Complete sequence number PDUs contain a complete list of all link-state PDUs in the IS-IS database. CSNPs are sent periodically on all links, and the receiving systems use the information in the CSNP to update and synchronize their link-state PDU databases. The designated router multicasts CSNPs on broadcast links in place of sending explicit acknowledgments for each link-state PDU.</li> <li>• <b>IIH</b>—IS-IS hello packets are broadcast to discover the identity of neighboring IS-IS systems and to determine whether the neighbors are Level 1 or Level 2 intermediate systems.</li> <li>• <b>LSP</b>—Link-state PDUs contain information about the state of adjacencies to neighboring IS-IS systems. Link-state PDUs are flooded periodically throughout an area.</li> <li>• <b>PSNP</b>—Partial sequence number PDUs are sent multicast by a receiver when it detects that it is missing a link-state PDU (when its link-state PDU database is out of date). The receiver sends a PSNP to the system that transmitted the CSNP, effectively requesting that the missing link-state PDU be transmitted. That routing device, in turn, forwards the missing link-state PDU to the requesting routing device.</li> <li>• <b>Unknown</b>—The PDU type is unknown.</li> </ul> |
| Received                    | Number of PDUs received since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Processed                   | Number of PDUs received less the number dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Drops                       | Number of PDUs dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Sent                        | Number of PDUs transmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Rexmit                      | Number of PDUs retransmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Total packets received/sent | Total number of PDUs received and transmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SNP queue length            | Number of CSPN and PSNP packets currently waiting in the queue for processing. This value is almost always 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LSP queue length            | Number of link-state PDUs waiting in the queue for processing. This value is almost always 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SPF runs                    | Number of shortest-path-first (SPF) calculations that have been performed. If this number is incrementing rapidly, it indicates that the network is unstable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fragments rebuilt           | Number of link-state PDU fragments that the local system has computed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LSP regenerations           | Number of link-state PDUs that have been regenerated. A link-state PDU is regenerated when it is nearing the end of its lifetime and it has not changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Purges initiated            | Number of purges that the system initiated. A purge is initiated if the software decides that a link-state PDU must be removed from the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### show isis statistics

```
user@host> show isis statistics
IS-IS statistics for merino:

PDU type Received Processed Drops Sent Rexmit
LSP 12227 12227 0 8184 683
IIH 113808 113808 0 115817 0
CSNP 198868 198868 0 198934 0
PSNP 6985 6979 6 8274 0
Unknown 0 0 0 0 0
Totals 331888 331882 6 331209 683

Total packets received: 331888 Sent: 331892

SNP queue length: 0 Drops: 0
LSP queue length: 0 Drops: 0

SPF runs: 1014
Fragments rebuilt: 1038
LSP regenerations: 425
Purges initiated: 0
```

## CHAPTER 22

# LLDP Operational Commands

- `clear lldp neighbors`
- `clear lldp statistics`
- `show lldp`
- `show lldp local-information`
- `show lldp neighbors`
- `show lldp remote-global-statistics`
- `show lldp statistics`

## clear lldp neighbors

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>clear lldp neighbor</b><br><b>&lt;interface <i>interface-name</i>&gt;</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Clear information regarding all Link Layer Discovery Protocol (LLDP) neighbors or LLDP neighbors of the specified interface.</p> <p>For information about interface names, see <a href="#">"Interface Naming Overview" on page 27</a>. For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i>. For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i>.</p> <p>For information about interface names in the Junos Fusion technology, see <i>Understanding Junos Fusion Ports</i>.</p> |
| <b>Options</b>                  | <b>interface <i>interface-name</i></b> —(Optional) Clear the LLDP neighbors on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">clear lldp statistics on page 1733</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">clear lldp neighbors on page 1732</a><br><a href="#">clear lldp neighbors interface ge-0/1/1.0 on page 1732</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided no feedback on the status of your request. You can enter the <b>show lldp neighbors</b> command before and after clearing the LLDP neighbors to verify the clear operation.                                                                                                                                                                                                                                                                                                                                                                                                |

### Sample Output

#### clear lldp neighbors

```
user@switch> clear lldp neighbors
```

#### clear lldp neighbors interface ge-0/1/1.0

```
user@switch> clear lldp neighbors interface ge-0/1/1.0
```

## clear lldp statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear lldpp neighbor</code><br><code>&lt;interface <i>interface-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Clear all Link Layer Discovery Protocols (LLDP) statistics or LLDP statistics associated with the specified interface.</p> <p>For information about interface names, see <a href="#">"Interface Naming Overview" on page 27</a>. For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i>. For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i>.</p> <p>For information about interface names in the Junos Fusion technology, see <i>Understanding Junos Fusion Ports</i>.</p> |
| <b>Options</b>                  | <code>interface <i>interface-name</i></code> —(Optional) Clear LLDP statistics on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear lldp neighbors on page 1732</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">clear lldp statistics on page 1733</a><br><a href="#">clear lldp statistics interface ge-0/1/1.0 on page 1733</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | When you enter this command, you are provided no feedback on the status of your request. You can enter the <code>show lldp statistics</code> command before and after clearing the LLDP statistics to verify the clear operation.                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### clear lldp statistics

```
user@switch> clear lldp statistics
```

### clear lldp statistics interface ge-0/1/1.0

```
user@switch> clear lldp statistics interface ge-0/1/1.0
```

## show lldp

|                                 |                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show lldp</code><br><code>&lt;detail&gt;</code>                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                  |
| <b>Description</b>              | Display information about the Link Layer Discovery Protocol (LLDP).                                                                                                          |
| <b>Options</b>                  | <b>detail</b> —(Optional) Display the detailed output level.                                                                                                                 |
| <b>Required Privilege Level</b> | view                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show lldp on page 1736</a><br><a href="#">show lldp detail on page 1736</a>                                                                                      |
| <b>Output Fields</b>            | <a href="#">Table 152 on page 1734</a> describes the output fields for the <b>show lldp</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 152: show lldp Output Fields**

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LLDP                   | Status of LLDP: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                      |
| Advertisement interval | Value of the advertisement interval parameter.                                                                                                                                                                                                                                                                                                                                           |
| Transmit delay         | Value of the transmit delay parameter.                                                                                                                                                                                                                                                                                                                                                   |
| Hold timer             | Value of the hold timer parameter.                                                                                                                                                                                                                                                                                                                                                       |
| Notification interval  | Value of the notification interval parameter.                                                                                                                                                                                                                                                                                                                                            |
| Config Trap Interval   | Value of the configuration trap parameter.                                                                                                                                                                                                                                                                                                                                               |
| Connection Hold timer  | Value of the connection hold timer parameter.                                                                                                                                                                                                                                                                                                                                            |
| Port ID TLV subtype    | <ul style="list-style-type: none"> <li><i>interface-name</i>—Indicates the interface name as the port information for the local device.</li> <li><b>locally-assigned</b>—Indicates that the sub-type for port ID TLV generation is locally assigned value of SNMP index of the interface.</li> </ul> <p>For more information about port ID TLV subtype, see <i>port-id-subtype</i>..</p> |



Table 152: show lldp Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Port Description TLV type | <p>Following value used for port description TLV:</p> <ul style="list-style-type: none"> <li><b>interface-alias (ifAlias)</b>—Indicates that the <i>ifAlias</i> MIB object value is used to generate the port description TLV.</li> <li><b>interface-description (ifDescr)</b>—Indicates that the <i>ifDescr</i> MIB object value is used to generate the port description TLV.</li> </ul> <p>For more information about port description TLV type, see <i>port-description-type</i>.</p> |
| Interface                 | <p>Name of the interface for which LLDP configuration information is being reported</p> <p>For information about interface names, see <a href="#">"Interface Naming Overview" on page 27</a>. For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i>. For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i>.</p>                                        |
| Parent Interface          | Name of the aggregated Ethernet interface, if any, to which the interface belongs.                                                                                                                                                                                                                                                                                                                                                                                                        |
| LLDP                      | LLDP operating state. The state can be Enabled or Disabled.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LLDP-MED                  | LLDP-MED operating state. The state can be Enabled or Disabled.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Power Negotiation         | LLDP power negotiation operating state. The state can be Enabled or Disabled.                                                                                                                                                                                                                                                                                                                                                                                                             |
| LLDP basic TLVs supported | List of basic LLDP TLVs supported by this device ( <b>detail</b> only).                                                                                                                                                                                                                                                                                                                                                                                                                   |
| LLDP 802 TLVs supported   | List of IEEE 802.1 LLDP TLVs supported by this device ( <b>detail</b> only).                                                                                                                                                                                                                                                                                                                                                                                                              |

## Sample Output

### show lldp

```
user@host> show lldp
LLDP : Enabled
Advertisement interval : 30 seconds
Transmit delay : 2 seconds
Hold timer : 120 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds
Port ID TLV subtype : locally-assigned
Port Description TLV type : interface-description (ifDescr)

Interface Parent Interface LLDP LLDP-MED Power Negotiation
all - Enabled
```

## Sample Output

### show lldp detail

```
user@host> show lldp detail
LLDP : Enabled
Advertisement interval : 30 seconds
Transmit delay : 2 seconds
Hold timer : 120 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds
Port ID TLV subtype : locally-assigned
Port Description TLV type : interface-description (ifDescr)

Interface Parent Interface LLDP LLDP-MED Power Negotiation
Neighbor count
all - Enabled
2

Interface Parent Interface Vlan-id Vlan-name
xe-0/0/0 - 4080 vlan-4080
xe-0/0/1 - 4080 vlan-4080

Basic Management TLVs supported:
End Of LLDPDU, Chassis ID, Port ID, Time To Live, Port Description, System Name,
System Description, System Capabilities, Management Address

Organizationally Specific TLVs supported:
Port VLAN tag, VLAN Name, MAC/PHY Configuration/Status, Link Aggregation,Maximum
Frame Size
```

## show lldp local-information

|                                 |                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show lldp local-information                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                                                          |
| <b>Description</b>              | Display local Link Layer Discovery Protocol (LLDP) information.                                                                                                                                                      |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show lldp local-information(Management Information Address Subtype is IPv4) on page 1739</a><br><a href="#">show lldp local-information(Management Information Address Subtype is IPv6) on page 1739</a> |
| <b>Output Fields</b>            | <a href="#">Table 153 on page 1737</a> describes the output fields for the <b>show lldp local-information</b> command. Output fields are listed in the approximate order in which they appear.                       |

**Table 153: show lldp local-information Output Fields**

| Field Name                            | Field Description                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LLDP Local Information details</b> | Information that follows pertains to the local system.                                                                                                                                                                                                                                                                                                                                      |
| <b>Chassis ID</b>                     | List of chassis identifiers for local information.                                                                                                                                                                                                                                                                                                                                          |
| <b>System name</b>                    | Local system name reported by LLDP.                                                                                                                                                                                                                                                                                                                                                         |
| <b>System descr</b>                   | Local system description reported by LLDP.                                                                                                                                                                                                                                                                                                                                                  |
| <b>System Capabilities</b>            | Capabilities (such as <b>Bridge</b> or <b>Router</b> ) that are <b>Supported</b> or <b>Enabled</b> by system on the interface.                                                                                                                                                                                                                                                              |
| <b>Management Information</b>         | Listed by <b>Interface Name</b> , <b>Address Subtype</b> (such as <b>ipv4</b> , <b>ipv6</b> ), <b>Address</b> (such as <b>192.168.168.229</b> , <b>1fd::1a10</b> ), <b>Interface Number</b> , and <b>Interface Numbering Subtype</b> .                                                                                                                                                      |
| <b>Interface Name</b>                 | <p>List of local interfaces.</p> <p>For information about interface names, see <a href="#">"Interface Naming Overview" on page 27</a>. For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i>. For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i>.</p> |
| <b>Parent Interface</b>               | Name of the <b>ae</b> interface to which the interface belongs                                                                                                                                                                                                                                                                                                                              |
| <b>Interface ID</b>                   | List of local interface identifiers.                                                                                                                                                                                                                                                                                                                                                        |

Table 153: show lldp local-information Output Fields (*continued*)

| Field Name                   | Field Description                                        |
|------------------------------|----------------------------------------------------------|
| <b>Interface Description</b> | List of local interface descriptions.                    |
| <b>Status</b>                | List of interface conditions: <b>UP</b> or <b>DOWN</b> . |

---

## Sample Output

### show lldp local-information(Management Information Address Subtype is IPv4)

```

user@host> show lldp local-information
LLDP Local Information details

Chassis ID : 64:87:88:65:37:c0
System name : apg-hp1
System descr : Juniper Networks, Inc. mx240 , version 14.1I20131231_0701_builder
 [builder] Build date: 2013-12-31 07:13:42 UTC

System Capabilities
 Supported : Bridge Router
 Enabled : Bridge Router

Management Information
 Interface Name : Unknown
 Address Subtype : IPv4(1)
 Address : 10.216.97.103
 Interface Number : 1
 Interface Numbering Subtype : ifIndex(2)

Interface name Parent Interface Interface ID Interface description Status
fxp0 - 1 fxp0 Up
me0 - 33 me0 Up
ge-2/0/0 ae0 1475 ge-2/0/0 Up
ge-2/0/1 ae0 1476 ge-2/0/1 Up

```

### show lldp local-information(Management Information Address Subtype is IPv6)

```

user@host> show lldp local-information
LLDP Local Information details

Chassis ID : ac:4b:c8:92:67:c0
System name : apg-hp
System descr : Juniper Networks, Inc. mx240 , version 13.2-20131210.0 [builder]
 Build date: 2013-12-10 06:23:15 UTC

System Capabilities
 Supported : Bridge Router
 Enabled : Bridge Router

Management Information
 Interface Name : fxp0
 Address Subtype : IPv6(2)
 Address : 1fd::1a20
 Interface Number : 1
 Interface Numbering Subtype : ifIndex(2)

Interface name Parent Interface Interface ID Interface description Status
ge-1/2/4 - 530 - Down
ge-1/2/5 - 531 - Down
ge-1/2/2 - 528 ge-1/2/2 Up
ge-1/2/3 - 529 ge-1/2/3 Up

```

## show lldp neighbors

**Syntax** `show lldp neighbors`  
`<interface interface-name>`

**Release Information** Command introduced in Junos OS Release 9.6.

**Description** Display information about LLDP neighbors.

For information about interface names, see [“Interface Naming Overview” on page 27](#). For information about interface names for TX Matrix routers, see *TX Matrix Router Chassis and Interface Names*. For information about FPC numbering on TX Matrix routers, see *Routing Matrix with a TX Matrix Router FPC Numbering*.

For information about extended port names in the Junos Fusion technology, see *Understanding Junos Fusion Ports*.

**Options** `interface interface-name`—(Optional) Display the neighbor information about a particular physical interface.



**NOTE:** Starting with Junos OS Release 14.2, you can also display LLDP neighbor details for management interfaces, such as `fxp` or `me`, on MX Series routers.

**Required Privilege Level** view

**Related Documentation**

- [clear lldp neighbors on page 1732](#)

**List of Sample Output** [show lldp neighbors on page 1743](#)  
[show lldp neighbors interface ge-0/0/4 \(Management Address is IPv4\) on page 1743](#)  
[show lldp neighbors interface ge-0/0/4 \(Management Address is IPv6\) on page 1744](#)  
[show lldp neighbors \(Management Ethernet Interfaces\) on page 1745](#)

**Output Fields** [Table 154 on page 1740](#) describes the output fields for the `show lldp neighbors` command. Output fields are listed in the approximate order in which they appear.

**Table 154: show lldp neighbors Output Fields**

| Field Name                      | Field Description                                                     |
|---------------------------------|-----------------------------------------------------------------------|
| LLDP Remote Devices Information | Information about remote devices.                                     |
| LocalInterface                  | List of local interfaces for which neighbor information is available. |
| ChassisId                       | List of chassis identifiers for neighbors.                            |

Table 154: show lldp neighbors Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                      |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>PortInfo</b>                  | List of port information gathered from neighbors. This could be the port identifier or port description.               |
| <b>SysName</b>                   | List of system names gathered from neighbors.                                                                          |
| <b>LLDP Neighbor Information</b> | Information about both local and neighbor systems on the interface (appears when the <b>interface</b> option is used). |
| <b>Local Information</b>         | Information about local systems on the interface (appears when the <b>interface</b> option is used).                   |
| <b>Neighbor Information</b>      | Information about both local and neighbor system on the interface (appears when the <b>interface</b> option is used).  |
| <b>Index</b>                     | Local interface index (appears when the <b>interface</b> option is used).                                              |
| <b>Time Mark</b>                 | Date and timestamp of information (appears when the <b>interface</b> option is used).                                  |
| <b>Time To Live</b>              | Number of seconds for which this information is valid (appears when the <b>interface</b> option is used).              |
| <b>Local Interface</b>           | Name of the local physical interface (appears when the <b>interface</b> option is used).                               |
| <b>Parent Interface</b>          | Name of the <b>ae</b> interface to which the interface belongs                                                         |
| <b>Local Port ID</b>             | Local port identifier (appears when the <b>interface</b> option is used).                                              |
| <b>Neighbor Information</b>      | Information about neighbor systems on the interface (appears when the <b>interface</b> option is used).                |
| <b>Chassis type</b>              | Type of chassis identifier supplied, such as <b>MAC address</b> (appears when the <b>interface</b> option is used).    |
| <b>Chassis ID</b>                | Chassis identifier of type listed (appears when the <b>interface</b> option is used).                                  |
| <b>Port type</b>                 | Type of port identifier supplied, such as <b>local</b> (appears when the <b>interface</b> option is used).             |
| <b>Port ID</b>                   | Port identifier of type listed (appears when the <b>interface</b> option is used).                                     |
| <b>Port description</b>          | Port description (appears when the <b>interface</b> option is used).                                                   |
| <b>System name</b>               | Name supplied by the system on the interface (appears when the <b>interface</b> option is used).                       |
| <b>System Description</b>        | Description supplied by the system on the interface (appears when the <b>interface</b> option is used).                |

Table 154: show lldp neighbors Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System Capabilities</b> | Capabilities (such as <b>bridge</b> or <b>router</b> ) that are <b>Supported</b> or <b>Enabled</b> by the system on the interface (appears when the <b>interface</b> option is used).                                                                                                                              |
| <b>Management address</b>  | Details of the management address: <b>Address Type</b> (such as <b>ipv4</b> and <b>ipv6</b> ), <b>Address</b> (such as <b>10.204.34.35</b> , <b>1fd::1a10</b> ), <b>Interface Number</b> , <b>Interface Subtype</b> , and <b>Organization Identifier (OID)</b> (appears when the <b>interface</b> option is used). |
| <b>Organization Info</b>   | One or more entries listing remote information by Organizationally Unique Identifier ( <b>OUI</b> ), <b>Subtype</b> , <b>Index</b> , and <b>Info</b> (appears when the <b>interface</b> option is used).                                                                                                           |

---



## Sample Output

### show lldp neighbors

```
user@host> show lldp neighbors
```

| Local Interface | Parent Interface | Chassis Id        | Port info | System Name |
|-----------------|------------------|-------------------|-----------|-------------|
| ge-2/0/0        | ae0              | ac:4b:c8:92:67:c0 | 528       | apg-hp      |
| ge-2/0/1        | ae0              | ac:4b:c8:92:67:c0 | 529       | apg-hp      |

## Sample Output

### show lldp neighbors interface ge-0/0/4 (Management Address is IPv4)

```
user@host> show lldp neighbors interface ge-0/0/4
```

LLDP Neighbor Information:

Local Information:

Index: 2 Time to live: 120 Time mark: Tue Dec 31 11:47:46 2013 Age: 15 secs

Local Interface : ge-2/0/1

Parent Interface : ae0

Local Port ID : 1476

Ageout Count : 0

Neighbour Information:

Chassis type : Mac address

Chassis ID : ac:4b:c8:92:67:c0

Port type : Locally assigned

Port ID : 529

Port description : ge-1/2/3

System name : apg-hp

System Description : Juniper Networks, Inc. mx240 , version 14.1-20131222.0

[builder] Build date: 2013-12-22 09:13:26 UTC

System capabilities

Supported: Bridge Router

Enabled : Bridge Router

Management address

Address Type : IPv4(1)

Address : 10.216.98.57

Interface Number : 1

Interface Subtype : ifIndex(2)

OID : 1.3.6.1.2.1.31.1.1.1.1.1.

Organization Info

OUI : IEEE 802.3 Private (0x00120f)

Subtype : MAC/PHY Configuration/Status (1)

Info : Autonegotiation [supported, enabled (0x3)], PMD Autonegotiation

Capability (0x1d), MAU Type (0x0)

Index : 1

Organization Info

OUI : IEEE 802.3 Private (0x00120f)

Subtype : Link Aggregation (3)

Info : Aggregation Status (0x3), Aggregation Port ID (1694498816)

Index : 2

Organization Info

OUI : IEEE 802.3 Private (0x00120f)

```
Subtype : Maximum Frame Size (4)
Info : MTU Size (1518)
Index : 3
```

### show lldp neighbors interface ge-0/0/4 (Management Address is IPv6)

```
user@host> show lldp neighbors interface ge-0/0/4
LLDP Neighbor Information:
Local Information:
Index: 1 Time to live: 120 Time mark: Thu Dec 12 07:19:45 2013 Age: 28 secs
Local Interface : ge-1/2/2
Parent Interface : -
Local Port ID : 528
Ageout Count : 0

Neighbour Information:
Chassis type : Mac address
Chassis ID : 64:87:88:65:37:c0
Port type : Locally assigned
Port ID : 1475
Port description : ge-2/0/0
System name : apg-hp1

System Description : Juniper Networks, Inc. mx240 , version 11.4R10 Build date:
2013-10-24 10:10:02 UTC

System capabilities
Supported: Bridge Router
Enabled : Bridge Router

Management address
Address Type : IPv6(2)
Address : 1fd::1a10
Interface Number : 1
Interface Subtype : ifIndex(2)
OID : 1.3.6.1.2.1.31.1.1.1.1.1.

Organization Info
OUI : IEEE 802.3 Private (0x00120f)
Subtype : MAC/PHY Configuration/Status (1)
Info : Autonegotiation [supported, enabled (0x3)], PMD Autonegotiation
Capability (0x5), MAU Type (0x0)
Index : 1

Organization Info
OUI : IEEE 802.3 Private (0x00120f)
Subtype : Link Aggregation (3)
Info : Aggregation Status (0x1), Aggregation Port ID (0)
Index : 2

Organization Info
OUI : IEEE 802.3 Private (0x00120f)
Subtype : Maximum Frame Size (4)
Info : MTU Size (1518)
Index : 3

Organization Info
OUI : Ethernet Bridged (0x0080c2)
Subtype : VLAN Name (3)
```

```
Info : VLAN ID (100), VLAN Name (vlan-100)
Index : 4
```

### show lldp neighbors (Management Ethernet Interfaces)

```
user@host> show lldp neighbors
```

| Local Interface<br>System Name | Parent Interface | Chassis Id        | Port info |
|--------------------------------|------------------|-------------------|-----------|
| fxp0<br>x2-sw35                | -                | 78:fe:3d:ee:4e:00 | 151       |
| xe-0/0/0<br>sitara             | -                | a8:d0:e5:50:26:c0 | 512       |
| xe-0/0/1<br>sitara             | -                | a8:d0:e5:50:26:c0 | 513       |

## [show lldp remote-global-statistics](#)

---

|                                 |                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show lldp remote-global-statistics                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                                           |
| <b>Description</b>              | Display remote Link Layer Discovery Protocol (LLDP) global statistics.                                                                                                                                |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                          |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show lldp remote-global-statistics on page 1747</a>                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 155 on page 1746</a> describes the output fields for the <b>show lldp remote-global-statistics</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 155: show lldp remote-global-statistics Output Fields**

| Field Name                          | Field Description                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------------------------|
| LLDP Remote Database Table Counters | Information about remote database table counters.                                                     |
| LastchangeTime                      | Time elapsed between LLDP agent startup and the last change to the remote database table information. |
| Inserts                             | Number of insertions made in the remote database table.                                               |
| Deletes                             | Number of deletions made in the remote database table.                                                |
| Drops                               | Number of LLDP frames dropped from the remote database table because of errors.                       |
| Ageouts                             | Number of remote database table entries that have aged out of the table.                              |

## Sample Output

### show lldp remote-global-statistics

```
user@host> show lldp remote-global-statistics
user@host> show lldp remote-global-statistics
LLDP Remote Database Table Counters
LastchangeTime Inserts Deletes Drops Ageouts
00:00:76 (76 sec) 192 0 0 0
```

## show lldp statistics

**Syntax** `show lldp statistics`  
`<interface interface-name>`

**Release Information** Command introduced in Junos OS Release 9.6.

**Description** Display information about Link Layer Discovery Protocol (LLDP) statistics.

**Options** `interface interface-name`—(Optional) Display the statistics about a particular physical interface.



**NOTE:** Starting with Junos OS Release 14.2, you can also display LLDP statistical details for management interfaces, such as `fxp` or `me`, on MX Series routers.

**Required Privilege Level** view

**Related Documentation** • [clear lldp statistics on page 1733](#)

**List of Sample Output** [show lldp statistics on page 1750](#)  
[show lldp statistics interface ge-0/1/1 on page 1750](#)

**Output Fields** [Table 156 on page 1748](#) describes the output fields for the `show lldp statistics` command. Output fields are listed in the approximate order in which they appear.

**Table 156: show lldp statistics Output Fields**

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interface</b>    | Interface name.<br><br>For information about interface names, see <a href="#">“Interface Naming Overview” on page 27</a> . For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i> . For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i> .<br><br>For information about extended port names in the Junos Fusion technology, see <i>Understanding Junos Fusion Ports</i> . |
| <b>Received</b>     | Number of LLDP frames received on this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Transmitted</b>  | Number of LLDP frames sent on this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Unknown-TLVs</b> | Number of LLDP frames with unsupported content received on this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>With-Errors</b>  | Number of LLDP frames with errors received on this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 156: show lldp statistics Output Fields (*continued*)

| Field Name           | Field Description                                                                         |
|----------------------|-------------------------------------------------------------------------------------------|
| <b>Discarded</b>     | Number of LLDP frames received on this interface that were discarded because of problems. |
| <b>Transmitted</b>   | Total number of LLDP frames that were transmitted on an interface.                        |
| <b>Untransmitted</b> | Total number of LLDP frames that were untransmitted on an interface.                      |

## Sample Output

### show lldp statistics

```
user@host> show lldp statistics
```

| Interface  | Parent Interface | Received | Unknown TLVs | With Errors |
|------------|------------------|----------|--------------|-------------|
| xe-3/0/0.0 | ae31.0           | 1564     | 0            | 0           |
| xe-3/0/1.0 | ae31.0           | 1564     | 0            | 0           |
| xe-3/0/2.0 | ae31.0           | 1565     | 0            | 0           |
| xe-3/0/3.0 | ae31.0           | 1566     | 0            | 0           |
| xe-3/0/4.0 | ae31.0           | 1598     | 0            | 0           |
| xe-3/0/5.0 | ae31.0           | 1598     | 0            | 0           |
| xe-3/0/6.0 | ae31.0           | 1596     | 0            | 0           |
| xe-3/0/7.0 | ae31.0           | 1597     | 0            | 0           |
| xe-5/0/6.0 | -                | 0        | 0            | 0           |
| xe-5/0/7.0 | -                | 0        | 0            | 0           |

| Discarded TLVs | Transmitted | Untransmitted |
|----------------|-------------|---------------|
| 0              | 3044        | 1             |
| 0              | 3044        | 1             |
| 0              | 3044        | 1             |
| 0              | 3044        | 1             |
| 0              | 3075        | 1             |
| 0              | 3075        | 1             |
| 0              | 3075        | 1             |
| 0              | 3075        | 1             |
| 0              | 17312       | 0             |
| 0              | 17312       | 0             |

## Sample Output

### show lldp statistics interface ge-0/1/1

```
user@host> show lldp statistics interface ge-0/1/1
```

| Interface | Received | Transmitted | Unknown-TLVs | With-Errors | Discarded |
|-----------|----------|-------------|--------------|-------------|-----------|
| ge-0/1/1  | 544      | 540         | 0            | 0           | 0         |



## CHAPTER 23

# MVRP Operational Commands

- `show mvrp`
- `show mvrp applicant-state`
- `show mvrp dynamic-vlan-memberships`
- `show mvrp interface`
- `show mvrp registration-state`
- `show mvrp statistics`

## show mvrp

|                                 |                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.<br>Command introduced in Junos OS Release 13.2X50-D10 for EX Series switches.                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display Multiple VLAN Registration Protocol (MVRP) configuration information.                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp applicant-state on page 1754</a></li> <li>• <a href="#">show mvrp dynamic-vlan-memberships on page 1756</a></li> <li>• <a href="#">show mvrp interface on page 1757</a></li> <li>• <a href="#">show mvrp registration-state on page 1758</a></li> <li>• <a href="#">show mvrp statistics on page 1760</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp on page 1752</a>                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | <a href="#">Table 157 on page 1752</a> lists the output fields for the <b>show mvrp</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                            |

**Table 157: show mvrp Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MVRP dynamic VLAN creation | Displays whether global MVRP dynamic VLAN creation is <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MVRP BPDU MAC address      | Displays the multicast media access control (MAC) address for MVRP. If configured, the provider MVRP multicast MAC address is used; otherwise, the customer MVRP multicast MAC address is used.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MVRP timers (ms)           | Displays MVRP timer information: <ul style="list-style-type: none"> <li>• <b>Interface</b>—The interface on which MVRP is configured.</li> <li>• <b>Join</b>—The maximum number of milliseconds the interfaces must wait before sending VLAN advertisements.</li> <li>• <b>Leave</b>—The number of milliseconds an interface must wait after receiving a Leave message to remove the interface from the VLAN specified in the message.</li> <li>• <b>LeaveAll</b>—The interval at which LeaveAll messages are sent on interfaces. LeaveAll messages maintain current MVRP VLAN membership information in the network.</li> </ul> |

## Sample Output

### show mvrp

```
user@host> show mvrp
```

```
MVRP configuration for routing instance 'default-switch'
MVRP dynamic VLAN creation : Enabled
MVRP BPDU MAC address : Customer bridge group (01-80-C2-00-00-21)
MVRP timers (ms)
 Interface Join Leave LeaveAll
 ge-11/2/8 200 800 10000
 ge-11/0/9 200 800 10000
 ge-11/3/0 200 800 10000
```

## show mvrp applicant-state

|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp applicant-state                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.                                                                                                                                                                                                                                             |
| <b>Description</b>              | For MX Series routers and EX Series switches, display Multiple VLAN Registration Protocol (MVRP) applicant state information.                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp on page 1752</a></li> <li>• <a href="#">show mvrp interface on page 1757</a></li> <li>• <a href="#">show mvrp registration-state on page 1758</a></li> <li>• <a href="#">show mvrp statistics on page 1760</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp applicant-state on page 1755</a>                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | Table 158 on page 1754 lists the output fields for the <b>show mvrp applicant-state</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                 |

**Table 158: show mvrp applicant-state Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>VLAN Id</b>   | Displays the VLAN ID number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Interface</b> | Displays the interface number associated with the VLAN ID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>State</b>     | Displays one of the following MVRP registrar states: <ul style="list-style-type: none"> <li>• <b>VO</b>—Very anxious observer.</li> <li>• <b>VP</b>—Very anxious passive.</li> <li>• <b>VA</b>—Very anxious new.</li> <li>• <b>AN</b>—Anxious new.</li> <li>• <b>AA</b>—Anxious active.</li> <li>• <b>QA</b>—Quiet active.</li> <li>• <b>LA</b>—Leaving active.</li> <li>• <b>AO</b>—Anxious observer.</li> <li>• <b>QO</b>—Quiet observer.</li> <li>• <b>LO</b>—Leaving observer.</li> <li>• <b>AP</b>—Anxious passive.</li> <li>• <b>QA</b>—Quiet passive.</li> </ul> |

## Sample Output

### show mvrp applicant-state

```
user@host> show mvrp applicant-state
MVRP applicant state for routing instance 'default-switch'
(V0) Very anxious observer, (VP) Very anxious passive, (VA) Very anxious new,
(AN) Anxious new, (AA) Anxious active, (QA) Quiet active, (LA) Leaving active,
(AO) Anxious observer, (QO) Quiet observer, (LO) Leaving observer,
(AP) Anxious passive, (QP) Quiet passive
```

| VLAN Id | Interface | State          |
|---------|-----------|----------------|
| 100     | ge-11/3/0 | Declaring (QA) |
| 200     | ge-11/3/0 | Declaring (QA) |
| 300     | ge-11/3/0 | Declaring (QA) |

## show mvrp dynamic-vlan-memberships

|                                 |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp dynamic-vlan-memberships                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.<br>Command introduced in Junos OS Release 13.2X50-D10 for EX Series switches.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display all VLANs that have been created dynamically using Multiple VLAN Registration Protocol (MVRP) on the router or switch.                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp on page 1752</a></li> <li>• <a href="#">show mvrp applicant-state on page 1754</a></li> <li>• <a href="#">show mvrp interface on page 1757</a></li> <li>• <a href="#">show mvrp registration-state on page 1758</a></li> <li>• <a href="#">show mvrp statistics on page 1760</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp dynamic-vlan-memberships on page 1756</a>                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | <a href="#">Table 159 on page 1756</a> lists the output fields for the <b>show mvrp dynamic-vlan-memberships</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                          |

**Table 159: show mvrp dynamic-vlan-memberships Output Fields**

| Field Name | Field Description                                                           |
|------------|-----------------------------------------------------------------------------|
| VLAN Id    | The VLAN ID of the dynamically created VLAN.                                |
| Interfaces | The interface or interfaces that are bound to the dynamically created VLAN. |

### Sample Output

#### show mvrp dynamic-vlan-memberships

```

user@host> show mvrp dynamic-vlan-memberships
MVRP dynamic vlans for routing instance 'default-switch'
(s) static vlan, (f) fixed registration

VLAN Id Interfaces
 100 (s) ge-11/3/0
 200 (s) ge-11/3/0
 300 (s)

```

## show mvrp interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp interface                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For MX Series routers and EX Series switches, display Multiple VLAN Registration Protocol (MVRP) interface-specific information.                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp on page 1752</a></li> <li>• <a href="#">show mvrp applicant-state on page 1754</a></li> <li>• <a href="#">show mvrp dynamic-vlan-memberships on page 1756</a></li> <li>• <a href="#">show mvrp registration-state on page 1758</a></li> <li>• <a href="#">show mvrp statistics on page 1760</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp interface on page 1757</a>                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | <a href="#">Table 160 on page 1757</a> lists the output fields for the <b>show mvrp interface</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                        |

**Table 160: show mvrp interface Output Fields**

| Field Name        | Field Description                                                                    |
|-------------------|--------------------------------------------------------------------------------------|
| Interface         | Interface on which MVRP is configured.                                               |
| Status            | Status of the MVRP: <b>Enabled</b> or <b>Disabled</b> .                              |
| Registration Mode | Registration for the interface: <b>Fixed</b> , <b>Forbidden</b> , or <b>Normal</b> . |
| Applicant Mode    | Applicant mode.                                                                      |

## Sample Output

### show mvrp interface

```

user@host> show mvrp interface
MVRP interface information for routing instance 'default-switch'

Interface Status Registration Mode Applicant
Mode
ge-11/2/8 Enabled Normal Normal
ge-11/0/9 Enabled Normal Normal
ge-11/3/0 Enabled Normal Normal

```

## show mvrp registration-state

|                                 |                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp registration-state                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.                                                                                                                                                                                                                                                   |
| <b>Description</b>              | For MX Series routers and EX Series switches, display Multiple VLAN Registration Protocol (MVRP) registration state information.                                                                                                                                                               |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp on page 1752</a></li> <li>• <a href="#">show mvrp dynamic-vlan-memberships on page 1756</a></li> <li>• <a href="#">show mvrp interface on page 1757</a></li> <li>• <a href="#">show mvrp statistics on page 1760</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp registration-state on page 1758</a>                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | Table 161 on page 1758 lists the output fields for the <b>show mvrp registration-state</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                    |

Table 161: show mvrp registration-state Output Fields

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>VLAN Id</b>         | Displays the VLAN ID number.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Interface</b>       | Displays the interface number associated with the VLAN ID.                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Registrar State</b> | Displays whether the registrar state is <b>Registered</b> or <b>Empty</b> .                                                                                                                                                                                                                                                                                                                                                     |
| <b>Forced State</b>    | Displays whether the forced state is <b>Registered</b> or <b>Empty</b> .                                                                                                                                                                                                                                                                                                                                                        |
| <b>Managed State</b>   | Displays one of the following states: <ul style="list-style-type: none"> <li>• <b>Fixed</b>—VLANs always stay in a registered state and are declared as such on all other forwarding ports.</li> <li>• <b>Normal</b>—VLANs participate in the MVRP protocol and honor incoming join requests normally.</li> <li>• <b>Forbidden</b>—VLANs ignore the incoming join requests and always stay in an unregistered state.</li> </ul> |
| <b>STP State</b>       | Displays whether the Spanning Tree Protocol (STP) is <b>Blocking</b> or <b>Forwarding</b> .                                                                                                                                                                                                                                                                                                                                     |

## Sample Output

### show mvrp registration-state

```
user@host> show mvrp registration-state
MVRP registration state for routing instance 'default-switch'
```



| VLAN Id | Interface | Registrar<br>State | Forced<br>State | Managed<br>State | STP<br>State |
|---------|-----------|--------------------|-----------------|------------------|--------------|
| 100     | ge-11/2/8 | Empty              | Registered      | Fixed            | Forwarding   |
|         | ge-11/0/9 | Empty              | Empty           | Normal           | Forwarding   |
|         | ge-11/3/0 | Registered         | Registered      | Normal           | Forwarding   |
| 101     | ge-11/2/8 | Empty              | Registered      | Fixed            | Forwarding   |
|         | ge-11/0/9 | Empty              | Empty           | Normal           | Forwarding   |
|         | ge-11/3/0 | Registered         | Registered      | Normal           | Forwarding   |

## show mvrp statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvrp statistics                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.1.                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For MX Series routers and EX Series switches, display Multiple VLAN Registration Protocol (MVRP) statistics in the form of Multiple Registration Protocol data unit (MRPDU) messages.                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show mvrp on page 1752</a></li> <li>• <a href="#">show mvrp applicant-state on page 1754</a></li> <li>• <a href="#">show mvrp dynamic-vlan-memberships on page 1756</a></li> <li>• <a href="#">show mvrp interface on page 1757</a></li> <li>• <a href="#">show mvrp registration-state on page 1758</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show mvrp statistics on page 1760</a>                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | <a href="#">Table 162 on page 1760</a> lists the output fields for the <b>show mvrp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                      |

**Table 162: show mvrp statistics Output Fields**

| Field Name                       | Field Description                                        |
|----------------------------------|----------------------------------------------------------|
| interface name                   | Interface for which MVRP statistics are displayed.       |
| VLAN IDs registered              | Number of VLAN IDs registered.                           |
| Sent MVRP PDUs                   | Number of MRPDU messages transmitted from the router.    |
| Received MVRP PDUs without error | Number of MRPDU messages received on the router.         |
| Received MVRP PDUs with error    | Number of invalid MRPDU messages received on the router. |

## Sample Output

### show mvrp statistics

```

user@host> show mvrp statistics
MVRP statistics for routing instance 'default-switch'

Interface name : ge-11/2/8
VLAN IDs registered : 0
Sent MVRP PDUs : 1467

```

Received MVRP PDUs without error: 0  
Received MVRP PDUs with error : 0

Interface name : ge-11/0/9  
VLAN IDs registered : 0  
Sent MVRP PDUs : 1418  
Received MVRP PDUs without error: 702  
Received MVRP PDUs with error : 0

Interface name : ge-11/3/0  
VLAN IDs registered : 2  
Sent MVRP PDUs : 1524  
Received MVRP PDUs without error: 1366  
Received MVRP PDUs with error : 0



## CHAPTER 24

# OSPF Operational Commands

- `clear (ospf | ospf3) database`
- `clear (ospf | ospf3) io-statistics`
- `clear (ospf | ospf3) neighbor`
- `clear (ospf | ospf3) overload`
- `clear (ospf | ospf3) statistics`
- `show (ospf | ospf3) backup coverage`
- `show (ospf | ospf3) backup lsp`
- `show (ospf | ospf3) backup neighbor`
- `show (ospf | ospf3) backup spf`
- `show ospf context-identifier`
- `show ospf database`
- `show ospf3 database`
- `show (ospf | ospf3) interface`
- `show (ospf | ospf3) io-statistics`
- `show (ospf | ospf3) log`
- `show (ospf | ospf3) neighbor`
- `show (ospf | ospf3) overview`
- `show (ospf | ospf3) route`
- `show (ospf | ospf3) statistics`

## clear (ospf | ospf3) database

---

**List of Syntax**    [Syntax on page 1764](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 1764](#)

**Syntax**    clear (ospf | ospf3) database  
              <advertising-router (*router-id* | self)>  
              <area *area-id*>  
              <asbrsummary>  
              <external>  
              <instance *instance-name*>  
              <inter-area-prefix>  
              <inter-area-router>  
              <intra-area-prefix>  
              <link-local>  
              <logical-system (all | *logical-system-name*)>  
              <lsa-id *lsa-id*>  
              <netsummary>  
              <network>  
              <nssa>  
              <opaque-area>  
              <purge>  
              <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
              <router>

**Syntax (EX Series Switch and QFX Series)**    clear (ospf | ospf3) database  
                                                          <advertising-router (*router-id* | self)>  
                                                          <area *area-id*>  
                                                          <asbrsummary>  
                                                          <external>  
                                                          <instance *instance-name*>  
                                                          <inter-area-prefix>  
                                                          <inter-area-router>  
                                                          <intra-area-prefix>  
                                                          <link-local>  
                                                          <lsa-id *lsa-id*>  
                                                          <netsummary>  
                                                          <network>  
                                                          <nssa>  
                                                          <opaque-area>  
                                                          <purge>  
                                                          <router>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              **advertising-router** *router-id*, **area** *area-id*, **asbrsummary**, **external**, **inter-area-prefix**, **inter-area-router**, **intra-area-prefix**, **link-local**, **lsa-id** *lsa-id*, **netsummary**, **network**, **nssa**, **opaque-area**, and **router** options added in Junos OS Release 8.3. You must use the **purge** command with these options.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              **realm** option added in Junos OS Release 9.2.  
                              **advertising-router** (*router-id* | **self**) option added in Junos OS Release 9.5.  
                              **advertising-router** (*router-id* | **self**) option introduced in Junos OS Release 9.5 for EX Series switches.

Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description** With the master Routing Engine, delete entries in the Open Shortest Path First (OSPF) link-state advertisement (LSA) database. With the backup Routing Engine, delete the OSPF LSA database and sync the new database with the master Routing Engine. You can also use the **purge** command with any of the options to discard rather than delete the specified LSA entries.



**CAUTION:** This command is useful only for testing. Use it with care, because it causes significant network disruption.

**Options** **none**—Delete all LSAs other than the system's own LSAs, which are regenerated. To resynchronize the database, the system destroys all adjacent neighbors that are in the state **EXSTART** or higher. The neighbors are then reacquired and the databases are synchronized.

**advertising-router** (*router-id* | **self**)—(Optional) Discard entries for the LSA entries advertised by the specified routing device or by this routing device.

**area** *area-id*—(Optional) Discard entries for the LSAs in the specified area.

**asbrsummary**—(Optional) Discard summary AS boundary router LSA entries.

**external**—(Optional) Discard external LSAs.

**instance** *instance-name*—(Optional) Delete or discard entries for the specified routing instance only.

**inter-area-prefix**—(OSPFv3 only) (Optional) Discard interarea prefix LSAs.

**inter-area-router**—(OSPFv3 only) (Optional) Discard interarea router LSAs.

**intra-area-prefix**—(OSPFv3 only) (Optional) Discard intra-area prefix LSAs.

**logical-system** (**all** | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**link-local**—(Optional) Delete link-local LSAs.

**lsa-id** *lsa-id*—(Optional) Discard the LSA entries with the specified LSA identifier.

**netsummary**—(Optional) Discard summary network LSAs.

**network**—(Optional) Discard network LSAs.

**nssa**—(Optional) Discard not-so-stubby area (NSSA) LSAs.

**opaque-area**—(Optional) Discard opaque area-scope LSAs.

**realm** (**ipv4-multicast** | **ipv4-unicast** | **ipv6-multicast**)—(OSPFv3 only) (Optional) Delete the entries for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**router**—(Optional) Discard router LSAs.

**purge**—(Optional) Discard all entries in the link-state advertisement database. All link-state advertisements are set to **MAXAGE** and are flooded. The database is repopulated when the originators of the link-state advertisements receive the **MAXAGE** link-state advertisements and reissue them.

**Required Privilege Level** clear

**Related Documentation**

- [show ospf database on page 1789](#)
- [show ospf3 database on page 1797](#)

**List of Sample Output** [clear ospf database on page 1766](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [clear ospf database](#)

```
user@host> clear ospf database
```



## clear (ospf | ospf3) io-statistics

---

|                                                 |                                                                                                                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1767</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1767</a>                                                                                                      |
| <b>Syntax</b>                                   | clear (ospf   ospf3) io-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                        |
| <b>Syntax (EX Series Switch and QFX Series)</b> | clear (ospf   ospf3) io-statistics                                                                                                                                                                                |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                          |
| <b>Description</b>                              | Clear Open Shortest Path First (OSPF) input and output statistics.                                                                                                                                                |
| <b>Options</b>                                  | <b>none</b> —Clear OSPF input and output statistics.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                 | clear                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                    | <a href="#">clear ospf io-statistics on page 1767</a>                                                                                                                                                             |
| <b>Output Fields</b>                            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                             |

### Sample Output

#### clear ospf io-statistics

```
user@host> clear ospf io-statistics
```

## clear (ospf | ospf3) neighbor

---

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1768</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1768</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Syntax                                   | <pre>clear (ospf   ospf3) neighbor &lt;area <i>area-id</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Syntax (EX Series Switch and QFX Series) | <pre>clear (ospf   ospf3) neighbor &lt;area <i>area-id</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Release Information                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description                              | Tear down Open Shortest Path First (OSPF) neighbor connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Options                                  | <p><b>none</b>—Tear down OSPF connections with all neighbors for all routing instances.</p> <p><b>area <i>area-id</i></b>—(Optional) Tear down neighbor connections for the specified area only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Tear down neighbor connections for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Tear down neighbor connections for the specified interface only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor</b>—(Optional) Clear the state of the specified neighbor only.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Clear the state of the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| Required Privilege Level                 | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Related Documentation                    | <ul style="list-style-type: none"><li>• <a href="#">show (ospf   ospf3) neighbor on page 1819</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| List of Sample Output                    | <a href="#">clear ospf neighbor on page 1769</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

### Sample Output

`clear ospf neighbor`

```
user@host> clear ospf neighbor
```

## clear (ospf | ospf3) overload

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1770</a><br><a href="#">Syntax (EX Series Switches) on page 1770</a>                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>                      | <code>clear (ospf   ospf3) overload</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b> | <code>clear (ospf   ospf3) overload</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                              |
| <b>Description</b>                 | Clear the Open Shortest Path First (OSPF) overload bit and rebuild link-state advertisements (LSAs).                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                     | <b>none</b> —Clear the overload bit and rebuild LSAs for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear the overload bit and rebuild LSAs for the specified routing instance only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | clear                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>       | <a href="#">clear ospf overload on page 1770</a>                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>               | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                 |

### Sample Output

#### clear ospf overload

```
user@host> clear ospf overload
```

## clear (ospf | ospf3) statistics

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1771</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1771</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                                   | clear (ospf   ospf3) statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (EX Series Switch and QFX Series)</b> | clear (ospf   ospf3) statistics<br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                              | Clear Open Shortest Path First (OSPF) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                  | <b>none</b> —Clear OSPF statistics.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear statistics for the specified routing instance only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b> —(Optional) (OSPFv3 only) Clear statistics for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default. |
| <b>Required Privilege Level</b>                 | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li>• <a href="#">show (ospf   ospf3) statistics on page 1836</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                    | <a href="#">clear ospf statistics on page 1771</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>                            | See <a href="#">show (ospf   ospf3) statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### clear ospf statistics

The following sample output displays OSPF statistics before and after the **clear ospf statistics** command is entered:

```
user@host> show ospf statistics
```

| Packet type | Total | Last 5 seconds |
|-------------|-------|----------------|
|-------------|-------|----------------|

|          | Sent | Received | Sent | Received |
|----------|------|----------|------|----------|
| Hello    | 3254 | 2268     | 3    | 1        |
| DbD      | 41   | 46       | 0    | 0        |
| LSReq    | 8    | 7        | 0    | 0        |
| LSUpdate | 212  | 154      | 0    | 0        |
| LSAck    | 65   | 98       | 0    | 0        |

|                          |   |                    |   |   |
|--------------------------|---|--------------------|---|---|
| DBDs retransmitted       | : | 3, last 5 seconds  | : | 0 |
| LSAs flooded             | : | 12, last 5 seconds | : | 0 |
| LSAs flooded high-prio   | : | 0, last 5 seconds  | : | 0 |
| LSAs retransmitted       | : | 0, last 5 seconds  | : | 0 |
| LSAs transmitted to nbr: | : | 3, last 5 seconds  | : | 0 |
| LSAs requested           | : | 5, last 5 seconds  | : | 0 |
| LSAs acknowledged        | : | 19, last 5 seconds | : | 0 |

|                      |   |   |
|----------------------|---|---|
| Flood queue depth    | : | 0 |
| Total rexmit entries | : | 0 |
| db summaries         | : | 0 |
| lsreq entries        | : | 0 |

Receive errors:

626 subnet mismatches

user@host> clear ospf statistics

user@host> show ospf statistics

| Packet type | Total |          | Last 5 seconds |          |
|-------------|-------|----------|----------------|----------|
|             | Sent  | Received | Sent           | Received |
| Hello       | 3     | 1        | 3              | 1        |
| DbD         | 0     | 0        | 0              | 0        |
| LSReq       | 0     | 0        | 0              | 0        |
| LSUpdate    | 0     | 0        | 0              | 0        |
| LSAck       | 0     | 0        | 0              | 0        |

|                          |   |                   |   |   |
|--------------------------|---|-------------------|---|---|
| DBDs retransmitted       | : | 0, last 5 seconds | : | 0 |
| LSAs flooded             | : | 0, last 5 seconds | : | 0 |
| LSAs flooded high-prio   | : | 0, last 5 seconds | : | 0 |
| LSAs retransmitted       | : | 0, last 5 seconds | : | 0 |
| LSAs transmitted to nbr: | : | 0, last 5 seconds | : | 0 |
| LSAs requested           | : | 0, last 5 seconds | : | 0 |
| LSAs acknowledged        | : | 0, last 5 seconds | : | 0 |

|                      |   |   |
|----------------------|---|---|
| Flood queue depth    | : | 0 |
| Total rexmit entries | : | 0 |
| db summaries         | : | 0 |
| lsreq entries        | : | 0 |

Receive errors:

None

## show (ospf | ospf3) backup coverage

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show (ospf   ospf3) backup coverage &lt;instance <i>instance-name</i>&gt; &lt; logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-unicast   ipv6-unicast)&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (QFX Series)</b>      | <pre>show (ospf   ospf3) backup coverage &lt;instance <i>instance-name</i>&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 10.0.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display information about the level of backup coverage available for all the nodes and prefixes in the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>none</b>—Display information about the level backup coverage for all OSPF routing instances in all logical systems.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Display information about the level of backup coverage for all logical systems or for a specific logical system.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the level of backup coverage for a specific OSPF routing instance.</p> <p><b>realm (ipv4-unicast   ipv6-unicast)</b>—(Optional) (OSPFv3 only) Display information about the level of backup coverage for the specific OSPFv3 realm, or address family.</p> <p><b>topology (default   <i>topology-name</i>)</b>—(Optional) (OSPFv2 only) Display information about the level of backup coverage for the specific OSPF topology.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">show (ospf   ospf3) backup lsp on page 1776</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <p><a href="#">show ospf backup coverage on page 1774</a></p> <p><a href="#">show ospf3 backup coverage on page 1774</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | <p><a href="#">Table 163 on page 1773</a> lists the output fields for the <b>show (ospf   ospf3) backup coverage</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 163: show (ospf | ospf3) backup coverage Output Fields**

| Field Name    | Field Description                                     |
|---------------|-------------------------------------------------------|
| Node Coverage | Information about backup coverage for each OSPF node. |
| Area          | Area number. Area 0.0.0.0 is the backbone.            |

Table 163: show (ospf | ospf3) backup coverage Output Fields (*continued*)

| Field Name             | Field Description                                                                             |
|------------------------|-----------------------------------------------------------------------------------------------|
| <b>Covered Nodes</b>   | Number of nodes for which backup coverage is available.                                       |
| <b>Total Nodes</b>     | Total number of OSPF nodes.                                                                   |
| <b>Route Coverage</b>  | Information about backup coverage for each type of OSPF route.                                |
| <b>Path Type</b>       | Type of OSPF path: <b>Intra</b> , <b>Inter</b> , <b>Ext1</b> , <b>Ext2</b> , and <b>All</b> . |
| <b>Covered Routes</b>  | For each path type, the number of routes for which backup coverage is available.              |
| <b>Total Routes</b>    | For each path type, the total number of configured routes.                                    |
| <b>Percent Covered</b> | For all nodes and for each path type, the percentage for which backup coverage is available.  |

## Sample Output

### show ospf backup coverage

```

user@host> show ospf backup coverage
Topology default coverage:

Node Coverage:

Area Covered Total Percent
 Nodes Nodes Covered
0.0.0.0 4 5 80.00%

Route Coverage:

Path Type Covered Total Percent
 Routes Routes Covered
Intra 8 14 57.14%
Inter 0 0 100.00%
Ext1 0 0 100.00%
Ext2 1 1 100.00%
All 9 15 60.00%

```

### show ospf3 backup coverage

```

user @host > show ospf3 backup coverage
show ospf3 backup coverage
Node Coverage:

Area Covered Total Percent
 Nodes Nodes Covered
0.0.0.0 4 5 80.00%

Route Coverage:

Path Type Covered Total Percent
 Routes Routes Covered

```



|       |   |   |         |
|-------|---|---|---------|
| Intra | 4 | 6 | 66.67%  |
| Inter | 0 | 0 | 100.00% |
| Ext1  | 0 | 0 | 100.00% |
| Ext2  | 1 | 1 | 100.00% |
| All   | 5 | 7 | 71.43%  |

## show (ospf | ospf3) backup lsp

**Syntax** `show (ospf | ospf3) backup lsp`  
`<logical-system (all | logical-system-name)>`  
`<realm (ipv4-unicast | ipv6-unicast)>`

**Release Information** Command introduced in Junos OS Release 10.0.

**Description** Display information about MPLS label-switched-paths (LSPs) designated as backup routes for OSPF routes.



**NOTE:** MPLS LSPs can be used as backup routes only for routes in the default OSPFv2 topology and not for any configured topology. Additionally, MPLS LSPs cannot be used as backup routes for nondefault instances either for OSPFv2 or OSPFv3.

**Options** `none`—Display information all MPLS LSPs designated as backup routes.

`logical-system (all | logical-system-name)`—(Optional) Display information about MPLS LSPs designated as backup routes for all logical systems or a specific logical system.

`realm (ipv4-unicast | ipv6-unicast)`—(Optional) (OSPFv3 only) Display information about MPLS LSPs designated as backup routes for a specific realm, or address family.

**Required Privilege Level** view

**Related Documentation**

- [show \(ospf | ospf3\) backup coverage on page 1773](#)

**List of Sample Output** [show ospf backup lsp on page 1777](#)  
[show ospf3 backup lsp on page 1777](#)

**Output Fields** [Table 164 on page 1776](#) lists the output fields for the `show (ospf | ospf3) backup lsp` command. Output fields are listed in the approximate order in which they appear.

**Table 164: show (ospf | ospf3) backup lsp Output Fields**

| Field Name           | Field Description                                  |
|----------------------|----------------------------------------------------|
| <i>MPLS LSP name</i> | Name of each MPLS LSP designated as a backup path. |
| <b>Egress</b>        | IP address of the egress router for the LSP.       |

Table 164: show (ospf | ospf3) backup lsp Output Fields (*continued*)

| Field Name  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status      | <p>State of the LSP:</p> <ul style="list-style-type: none"> <li>• <b>Up</b>—The router can detect RSVP hello messages from the neighbor.</li> <li>• <b>Down</b>—The router has received one of the following indications: <ul style="list-style-type: none"> <li>• Communication failure from the neighbor.</li> <li>• Communication from IGP that the neighbor is unavailable.</li> <li>• Change in the sequence numbers in the RSVP hello messages sent by the neighbor.</li> </ul> </li> <li>• <b>Deleted</b>—The LSP is no longer available as a backup path.</li> </ul> |
| Last change | Time elapsed since the neighbor state changed either from <b>up</b> or <b>down</b> or from <b>down</b> to <b>up</b> . The format is <i>hh:mm:ss</i> .                                                                                                                                                                                                                                                                                                                                                                                                                        |
| TE-metric   | Configured traffic engineering metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Metric      | Configured metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### show ospf backup lsp

```

user@host> show ospf backup lsp
tobanff
 Egress: 10.255.71.239, Status: up, Last change: 00:00:23
 TE-metric: 0, Metric: 0

```

## Sample Output

### show ospf3 backup lsp

```

user@host> show ospf3 backup lsp
tobanff
 Egress: 10.255.71.239, Status: up, Last change: 00:00:45
 TE-metric: 0, Metric: 0

```

## show (ospf | ospf3) backup neighbor

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Syntax</b>                   | <pre>show (ospf   ospf3) backup neighbor &lt;area <i>area-id</i>&gt; &lt;instance (default   <i>instance-name</i>)&gt; &lt;logical-system (default   ipv4-multicast   <i>logical-system-name</i>)&gt; &lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Syntax (QFX Series)</b>      | <pre>show (ospf   ospf3) backup neighbor &lt;area <i>area-id</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 10.0.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Description</b>              | Display the neighbors through which direct next hops for the backup paths are available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Options</b>                  | <p><b>none</b>—Display all neighbors that have direct next hops for backup paths.</p> <p><b>area <i>area-id</i></b>—(Optional) Display the area information.</p> <p><b>instance (default   <i>instance-name</i>)</b>—(Optional) Display information about the default routing instance or a particular routing instance.</p> <p><b>logical-system (default   ipv4-multicast   <i>logical-system-name</i>)</b>—(Optional) Display information about the default logical system, IPv4 multicast logical system, or a particular logical system.</p> <p><b>topology (default   ipv4-multicast   <i>topology-name</i>)</b>—(OSPFv2 only) (Optional) Display information about the default topology, IPv4 multicast topology, or a particular topology.</p> |  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show (ospf   ospf3) backup spf on page 1780</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| <b>List of Sample Output</b>    | <a href="#">show ospf backup neighbor on page 1779</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>Output Fields</b>            | Table 165 on page 1778 lists the output fields for the <b>show (ospf   ospf3) backup neighbor</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |

Table 165: show (ospf | ospf3) backup neighbor Output Fields

| Field Name              | Field Description                                 | Level of Output |
|-------------------------|---------------------------------------------------|-----------------|
| Neighbor to Self Metric | Metric from the backup neighbor to the OSPF node. | All levels      |

Table 165: show (ospf |ospf3) backup neighbor Output Fields (*continued*)

| Field Name              | Field Description                                 | Level of Output |
|-------------------------|---------------------------------------------------|-----------------|
| Self to Neighbor Metric | Metric from the OSPF node to the backup neighbor. | All levels      |
| Direct next-hop         | Interface and address of the direct next hop.     | All levels      |

Sample Output

show ospf backup neighbor

```
user@host> show ospf backup neighbor
Topology default backup neighbors:

Area 0.0.0.5 backup neighbors:

10.0.0.5
 Neighbor to Self Metric: 5
 Self to Neighbor Metric: 5
 Direct next-hop: ge-4/0/0.111 via 10.0.175.5

10.0.0.6
 Neighbor to Self Metric: 5
 Self to Neighbor Metric: 5
 Direct next-hop: ge-4/1/0.110 via 10.0.176.6
```

## show (ospf | ospf3) backup spf

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <code>show (ospf   ospf3) backup spf</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;area <i>area-id</i>&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;no-coverage&gt;</code><br><code>&lt;node-id&gt;</code><br><code>&lt;realm (ipv4-unicast   ipv6-unicast)&gt;</code><br><code>&lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Syntax (QFX Series)      | <code>show (ospf   ospf3) backup spf</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;area <i>area-id</i>&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;no-coverage&gt;</code><br><code>&lt;node-id&gt;</code><br><code>&lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Release Information      | Command introduced in JUNOS Release 10.0.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description              | Display information about OSPF shortest-path-first calculations for backup paths.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Options                  | <p><b>none</b>—Display information about OSPF shortest-path-first (SPF) calculations for all backup paths for all destination nodes.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display the area information.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Display information about all logical systems or a specific logical system.</p> <p><b>no-coverage</b>—(Optional) Display information if there is no backup coverage.</p> <p><b>node-id</b>—(Optional) Display information about the node specified.</p> <p><b>realm (ipv4-unicast   ipv6-unicast)</b>—(Optional) Display information about the <b>ipv4</b> or <b>ipv6</b> realm.</p> <p><b>topology (default   ipv4-multicast   <i>topology-name</i>)</b>—(Optional) (OSPFv2 only) Display information about the default topology, IPv4 multicast topology, or a specific topology.</p> |
| Required Privilege Level | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| List of Sample Output    | <a href="#">show ospf backup spf on page 1781</a><br><a href="#">show ospf backup spf detail on page 1781</a><br><a href="#">show ospf3 backup spf on page 1784</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Output Fields** [Table 166 on page 1781](#) lists the output fields for the **show (ospf |ospf3) backup spf** command. Output fields are listed in the approximate order in which they appear.

**Table 166: show (ospf |ospf3) backup spf Output Fields**

| Field Name                         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Area <i>area-id</i> results</b> | Area for which the results are displayed. Area 0.0.0.0 is the backbone area.                                                                                                                                                                                                                                                                                                                                                               | All levels      |
| <i>address</i>                     | Address of the node for which the results are displayed.                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Self to Destination Metric</b>  | Metric from the node to the destination.                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Parent Node</b>                 | Address of the parent node.                                                                                                                                                                                                                                                                                                                                                                                                                | All levels      |
| <b>Primary next-hop</b>            | Address of the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Backup Neighbor</b>             | Address of the backup neighbor or LSP endpoint and the following information: <ul style="list-style-type: none"> <li>Neighbor to Destination Metric</li> <li>Neighbor to Self Metric</li> <li>Self to Neighbor Metric</li> <li>Status (Eligible, Not Eligible, Not Evaluated) and the reason for the status.</li> </ul> <p><b>NOTE:</b> If the backup neighbor is an LSP endpoint, it is indicated as such after the neighbor address.</p> | All levels      |

## Sample Output

### show ospf backup spf

```

user@host> show ospf backup spf
Topology default results:

Area 0.0.0.0 results:

pro16-d-1o0.xxx.yyyy.net
Self to Destination Metric: 1
Parent Node: pro16-b-1o0.xxx.yyyy.net
Primary next-hop: at-1/0/1.0
Backup Neighbor: pro16-c-1o0.xxx.yyyy.net (LSP endpoint)
 Neighbor to Destination Metric: 4, Neighbor to Self Metric: 3
 Self to Neighbor Metric: 3
 Not eligible, Reason: Path loops
Backup Neighbor: pro16-d-1o0.xxx.yyyy.net
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
...

```

### show ospf backup spf detail

```

user@host> show ospf backup spf detail

```

Topology default results:

Area 0.0.0.0 results:

11.14.10.2

```
Self to Destination Metric: 1
Parent Node: 10.255.70.103
Primary next-hop: ae0.0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
```

10.255.71.52

```
Self to Destination Metric: 1
Parent Node: 11.14.10.2
Primary next-hop: ae0.0 via 11.14.10.2
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
```

10.255.71.242

```
Self to Destination Metric: 1
Parent Node: 10.255.70.103
Primary next-hop: as0.0
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
```

10.255.71.243

```
Self to Destination Metric: 1
Parent Node: 10.255.70.103
Primary next-hop: so-6/0/0.0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 1
```



```

 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops

12.15.0.1
 Self to Destination Metric: 2
 Parent Node: 10.255.71.243
 Primary next-hop: so-6/0/0.0
 Backup next-hop: ae0.0 via 11.14.10.2
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 17, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

10.255.71.238
 Self to Destination Metric: 2
 Parent Node: 10.255.71.243
 Primary next-hop: so-6/0/0.0
 Backup next-hop: as0.0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

10.255.71.239
 Self to Destination Metric: 2
 Parent Node: 12.15.0.1
 Primary next-hop: so-6/0/0.0
 Backup next-hop: ae0.0 via 11.14.10.2
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.242

```

```
Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
Self to Neighbor Metric: 1
Not evaluated, Reason: Interface is already covered
```

#### 14.15.0.2

```
Self to Destination Metric: 3
Parent Node: 10.255.71.239
Primary next-hop: so-6/0/0.0
Backup next-hop: ae0.0 via 11.14.10.2
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 17, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered
```

### show ospf3 backup spf

```
user@host> show ospf3 backup spf
Area 0.0.0.0 results:
```

#### 10.255.71.52;0.0.0.5

```
Self to Destination Metric: 1
Parent Node: 10.255.70.103
Primary next-hop: ae0.0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
```

#### 10.255.71.52

```
Self to Destination Metric: 1
Parent Node: 10.255.71.52;0.0.0.5
Primary next-hop: ae0.0 via fe80::290:69ff:fe0f:67f0
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
```

```
10.255.71.242
 Self to Destination Metric: 1
 Parent Node: 10.255.70.103
 Primary next-hop: as0.0
 Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
 Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
 Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops

10.255.71.243
 Self to Destination Metric: 1
 Parent Node: 10.255.70.103
 Primary next-hop: so-6/0/0.0
 Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 0, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
 Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops
 Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not eligible, Reason: Path loops

10.255.71.243;0.0.0.2
 Self to Destination Metric: 2
 Parent Node: 10.255.71.243
 Primary next-hop: so-6/0/0.0
 Backup next-hop: ae0.0 via fe80::290:69ff:fe0f:67f0
 Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
 Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
 Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 17, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

10.255.71.238
 Self to Destination Metric: 2
 Parent Node: 10.255.71.243
 Primary next-hop: so-6/0/0.0
 Backup next-hop: as0.0
 Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
```

```

Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

10.255.71.239
 Self to Destination Metric: 2
 Parent Node: 10.255.71.243;0.0.0.2
 Primary next-hop: so-6/0/0.0
 Backup next-hop: ae0.0 via fe80::290:69ff:fe0f:67f0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 1, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 16, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

10.255.71.239;0.0.0.4
 Self to Destination Metric: 3
 Parent Node: 10.255.71.239
 Primary next-hop: so-6/0/0.0
 Backup next-hop: ae0.0 via fe80::290:69ff:fe0f:67f0
Backup Neighbor: 10.255.71.243
 Neighbor to Destination Metric: 2, Neighbor to Self Metric: 1
 Self to Neighbor Metric: 1
 Not eligible, Reason: Primary next-hop link fate sharing
Backup Neighbor: 10.255.71.52
 Neighbor to Destination Metric: 15, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Eligible, Reason: Contributes backup next-hop
Backup Neighbor: 10.255.71.242
 Neighbor to Destination Metric: 17, Neighbor to Self Metric: 15
 Self to Neighbor Metric: 1
 Not evaluated, Reason: Interface is already covered

```

## show ospf context-identifier

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 1787</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 1787</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                     | <pre>show ospf context-identifier &lt;brief   detail&gt; &lt;area <i>area-id</i>&gt; &lt;context-id&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show ospf context-identifier &lt;brief   detail&gt; &lt;area <i>area-id</i>&gt; &lt;context-id&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                        | <p>Command introduced in Junos OS Release 10.4.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                                | Display the context identifier information processed and advertised by Open Shortest Path First (OSPF) for egress protection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                    | <p><b>none</b>—Display information about all context identifiers.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display information about the context identifier for the specified area.</p> <p><b>context-id</b>—(Optional) Display information about the specified context identifier.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the context identifier for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"> <li><i>egress-protection (Layer 2 circuit)</i> in the <i>Junos OS VPNs Library for Routing Devices</i></li> <li><i>egress-protection (MPLS)</i> in the <i>Junos OS VPNs Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                      | <a href="#">show ospf context-identifier on page 1788</a><br><a href="#">show ospf context-identifier detail on page 1788</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>                              | <p><a href="#">Table 167 on page 1788</a> lists the output fields for the <b>show ospf context-identifier</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 167: show ospf context-identifier Output Fields

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                              | Level of Output |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Context</b>              | IPv4 address that defines a protection pair. The context is manually configured on both primary and protector provider edge (PE) devices.                                                                                                                                                                                                                                                      | All levels      |
| <b>Status</b>               | State of the path: <b>active</b> or <b>inactive</b> .                                                                                                                                                                                                                                                                                                                                          | All levels      |
| <b>Metric</b>               | Advertised OSPF metric.                                                                                                                                                                                                                                                                                                                                                                        | All levels      |
| <b>Area</b>                 | OSPF area number.                                                                                                                                                                                                                                                                                                                                                                              | All levels      |
| <b>Other Advertisements</b> | Other advertisements received by the OSPF node: <ul style="list-style-type: none"><li>• <b>Advertising router</b>— Address of the device that sent the advertisement.</li><li>• <b>Type</b>—Type of OSPF path: <b>inter-area</b> and <b>stub</b>.</li><li>• <b>Metric</b>—Advertised OSPF metric.</li><li>• <b>None</b>—No additional advertisements were received by the OSPF node.</li></ul> | <b>detail</b>   |

## Sample Output

### show ospf context-identifier

```
user@host> show ospf context-identifier
Context-id: 2.2.4.3
Status: active, Metric: 65534, PE role: protector, Area: 0.0.0.0
```

### show ospf context-identifier detail

```
user@host> show ospf context-identifier detail
Context-id: 88.24.13.1
Status: inactive, Metric: 0, PE role: protector, Area: 0.0.0.13
Other Advertisements:
 Advertising router: 8.8.8.103
 Type: stub link
 Metric: 65534
```

## show ospf database

**List of Syntax**   [Syntax on page 1789](#)  
[Syntax \(EX Series Switch and QFX Series\) on page 1789](#)

**Syntax**   `show ospf database`  
                   `<brief | detail | extensive | summary>`  
                   `<advertising-router (address | self)>`  
                   `<area area-id>`  
                   `<asbrsummary>`  
                   `<external>`  
                   `<instance instance-name>`  
                   `<link-local>`  
                   `<logical-system (all | logical-system-name)>`  
                   `<lsa-id lsa-id>`  
                   `<netsummary>`  
                   `<network>`  
                   `<nssa>`  
                   `<opaque-area>`  
                   `<router>`

**Syntax (EX Series Switch and QFX Series)**   `show ospf database`  
                                           `<brief | detail | extensive | summary>`  
                                           `<advertising-router (address | self)>`  
                                           `<area area-id>`  
                                           `<asbrsummary>`  
                                           `<external>`  
                                           `<instance instance-name>`  
                                           `<link-local>`  
                                           `<lsa-id lsa-id>`  
                                           `<netsummary>`  
                                           `<network>`  
                                           `<nssa>`  
                                           `<opaque-area>`  
                                           `<router>`

**Release Information**   Command introduced before Junos OS Release 7.4.  
                                   Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                   **advertising-router self (address | self)** option introduced in Junos OS Release 9.5.  
                                   **advertising-router self (address | self)** option introduced in Junos OS Release 9.5 for EX Series switches.  
                                   Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**   Display the entries in the Open Shortest Path First version 2 (OSPFv2) link-state database, which contains data about link-state advertisement (LSA) packets.

**Options**   **none**—Display standard information about entries in the OSPFv2 link-state database for all routing instances.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**advertising-router (address | self)**—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.

**area *area-id***—(Optional) Display the LSAs in a particular area.

**asbrsummary**—(Optional) Display summary AS boundary router LSA entries.

**external**—(Optional) Display external LSAs.

**instance *instance-name***—(Optional) Display all OSPF database information under the named routing instance.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id *lsa-id***—(Optional) Display the LSA with the specified LSA identifier.

**netsummary**—(Optional) Display summary network LSAs.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**opaque-area**—(Optional) Display opaque area-scope LSAs.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- [clear \(ospf | ospf3\) database on page 1764](#)

**List of Sample Output**

[show ospf database on page 1792](#)  
[show ospf database brief on page 1792](#)  
[show ospf database detail on page 1792](#)  
[show ospf database extensive on page 1794](#)  
[show ospf database summary on page 1796](#)

**Output Fields**

[Table 168 on page 1790](#) describes the output fields for the **show ospf database** command. Output fields are listed in the approximate order in which they appear.

**Table 168: show ospf database Output Fields**

| Field Name     | Field Description                                                                                                                                        | Level of Output |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>area</b>    | Area number. Area 0.0.0.0 is the backbone area.                                                                                                          | All levels      |
| <b>Type</b>    | Type of link advertisement: <b>ASBRSum</b> , <b>Extern</b> , <b>Network</b> , <b>NSSA</b> , <b>OpaqArea</b> , <b>Router</b> , or <b>Summary</b> .        | All levels      |
| <b>ID</b>      | LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device. | All levels      |
| <b>Adv Rtr</b> | Address of the routing device that sent the advertisement.                                                                                               | All levels      |



Table 168: show ospf database Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output         |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Seq</b>                              | Link sequence number of the advertisement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels              |
| <b>Age</b>                              | Time elapsed since the LSA was originated, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels              |
| <b>Opt</b>                              | Optional OSPF capabilities associated with the LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels              |
| <b>Cksum</b>                            | Checksum value of the LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels              |
| <b>Len</b>                              | Length of the advertisement, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels              |
| <b>Router</b>                           | Router link-state advertisement information: <ul style="list-style-type: none"> <li><b>bits</b>—Flags describing the routing device that generated the LSP.</li> <li><b>link count</b>—Number of links in the advertisement.</li> <li><b>id</b>—ID of a routing device or subnet on the link.</li> <li><b>data</b>—For stub networks, the subnet mask; otherwise, the IP address of the routing device that generated the LSP.</li> <li><b>type</b>—Type of link. It can be <b>PointToPoint</b>, <b>Transit</b>, <b>Stub</b>, or <b>Virtual</b>.</li> <li><b>TOS count</b>—Number of type-of-service (ToS) entries in the advertisement.</li> <li><b>TOS 0 metric</b>—Metric for ToS 0.</li> <li><b>TOS</b>—Type-of-service (ToS) value.</li> <li><b>metric</b>—Metric for the ToS.</li> </ul> | <b>detail extensive</b> |
| <b>Network</b>                          | Network link-state advertisement information: <ul style="list-style-type: none"> <li><b>mask</b>—Network mask.</li> <li><b>attached router</b>—ID of the attached neighbor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Summary</b>                          | Summary link-state advertisement information: <ul style="list-style-type: none"> <li><b>mask</b>—Network mask.</li> <li><b>TOS</b>—Type-of-service (ToS) value.</li> <li><b>metric</b>—Metric for the ToS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Gen timer</b>                        | How long until the LSA is regenerated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>        |
| <b>Aging timer</b>                      | How long until the LSA expires.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>        |
| <b>Installed <i>hh:mm:ss</i> ago</b>    | How long ago the route was installed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b>        |
| <b>expires in <i>hh:mm:ss</i></b>       | How long until the route expires.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>extensive</b>        |
| <b>sent <i>hh:mm:ss</i> ago</b>         | How long ago the LSA was sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b>        |
| <b>Last changed <i>hh:mm:ss</i> ago</b> | How long ago the route was changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>extensive</b>        |

Table 168: show ospf database Output Fields (*continued*)

| Field Name          | Field Description                                                                  | Level of Output  |
|---------------------|------------------------------------------------------------------------------------|------------------|
| <b>Change count</b> | Number of times the route has changed.                                             | <b>extensive</b> |
| <b>Ours</b>         | Indicates that this is a local advertisement.                                      | <b>extensive</b> |
| <b>Router LSAs</b>  | Number of router link-state advertisements in the link-state database.             | <b>summary</b>   |
| <b>Network LSAs</b> | Number of network link-state advertisements in the link-state database.            | <b>summary</b>   |
| <b>Summary LSAs</b> | Number of summary link-state advertisements in the link-state database.            | <b>summary</b>   |
| <b>NSSA LSAs</b>    | Number of not-so-stubby area link-state advertisements in the link-state database. | <b>summary</b>   |

## Sample Output

### show ospf database

```

user@host> show ospf database
OSPF link state database, Area 0.0.0.1
 Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.70.103 10.255.70.103 0x80000002 215 0x20 0x4112 48
Router *10.255.71.242 10.255.71.242 0x80000002 214 0x20 0x11b1 48
Summary *23.1.1.0 10.255.71.242 0x80000002 172 0x20 0x6d72 28
Summary *24.1.1.0 10.255.71.242 0x80000002 177 0x20 0x607e 28
NSSA *33.1.1.1 10.255.71.242 0x80000002 217 0x28 0x73bd 36

 OSPF link state database, Area 0.0.0.2
 Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.71.52 10.255.71.52 0x80000004 174 0x20 0xd021 36
Router *10.255.71.242 10.255.71.242 0x80000003 173 0x20 0xe191 36
Network *23.1.1.1 10.255.71.242 0x80000002 173 0x20 0x9c76 32
Summary *12.1.1.0 10.255.71.242 0x80000001 217 0x20 0xfeec 28
Summary *24.1.1.0 10.255.71.242 0x80000002 177 0x20 0x607e 28
NSSA *33.1.1.1 10.255.71.242 0x80000001 222 0x28 0xe047 36

 OSPF link state database, Area 0.0.0.3
 Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.71.238 10.255.71.238 0x80000003 179 0x20 0x3942 36
Router *10.255.71.242 10.255.71.242 0x80000003 177 0x20 0xf37d 36
Network *24.1.1.1 10.255.71.242 0x80000002 177 0x20 0xc591 32
Summary *12.1.1.0 10.255.71.242 0x80000001 217 0x20 0xfeec 28
Summary *23.1.1.0 10.255.71.242 0x80000002 172 0x20 0x6d72 28
NSSA *33.1.1.1 10.255.71.242 0x80000001 222 0x28 0xeb3b 36

```

### show ospf database brief

The output for the **show ospf database brief** command is identical to that for the **show ospf database** command. For sample output, see [show ospf database on page 1792](#).

### show ospf database detail

```
user@host> show ospf database detail
```

```

OSPF link state database, Area 0.0.0.1
Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.70.103 10.255.70.103 0x80000002 261 0x20 0x4112 48
 bits 0x0, link count 2
 id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
 TOS count 0, TOS 0 metric 1
 id 12.1.1.0, data 255.255.255.0, Type Stub (3)
 TOS count 0, TOS 0 metric 1
Router *10.255.71.242 10.255.71.242 0x80000002 260 0x20 0x11b1 48
 bits 0x3, link count 2
 id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
 TOS count 0, TOS 0 metric 1
 id 12.1.1.0, data 255.255.255.0, Type Stub (3)
 TOS count 0, TOS 0 metric 1
Summary *23.1.1.0 10.255.71.242 0x80000002 218 0x20 0x6d72 28
 mask 255.255.255.0
 TOS 0x0, metric 1
Summary *24.1.1.0 10.255.71.242 0x80000002 223 0x20 0x607e 28
 mask 255.255.255.0
 TOS 0x0, metric 1
NSSA *33.1.1.1 10.255.71.242 0x80000002 263 0x28 0x73bd 36
 mask 255.255.255.255
 Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0

```

```

OSPF link state database, Area 0.0.0.2
Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.71.52 10.255.71.52 0x80000004 220 0x20 0xd021 36
 bits 0x0, link count 1
 id 23.1.1.1, data 23.1.1.2, Type Transit (2)
 TOS count 0, TOS 0 metric 1
Router *10.255.71.242 10.255.71.242 0x80000003 219 0x20 0xe191 36
 bits 0x3, link count 1
 id 23.1.1.1, data 23.1.1.1, Type Transit (2)
 TOS count 0, TOS 0 metric 1
Network *23.1.1.1 10.255.71.242 0x80000002 219 0x20 0x9c76 32
 mask 255.255.255.0
 attached router 10.255.71.242
 attached router 10.255.71.52
Summary *12.1.1.0 10.255.71.242 0x80000001 263 0x20 0xfeec 28
 mask 255.255.255.0
 TOS 0x0, metric 1
Summary *24.1.1.0 10.255.71.242 0x80000002 223 0x20 0x607e 28
 mask 255.255.255.0
 TOS 0x0, metric 1
NSSA *33.1.1.1 10.255.71.242 0x80000001 268 0x28 0xe047 36
 mask 255.255.255.255
 Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0

```

```

OSPF link state database, Area 0.0.0.3
Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.71.238 10.255.71.238 0x80000003 225 0x20 0x3942 36
 bits 0x0, link count 1
 id 24.1.1.1, data 24.1.1.2, Type Transit (2)
 TOS count 0, TOS 0 metric 1
Router *10.255.71.242 10.255.71.242 0x80000003 223 0x20 0xf37d 36
 bits 0x3, link count 1
 id 24.1.1.1, data 24.1.1.1, Type Transit (2)
 TOS count 0, TOS 0 metric 1
Network *24.1.1.1 10.255.71.242 0x80000002 223 0x20 0xc591 32
 mask 255.255.255.0
 attached router 10.255.71.242

```

```

 attached router 10.255.71.238
Summary *12.1.1.0 10.255.71.242 0x80000001 263 0x20 0xfeec 28
mask 255.255.255.0
TOS 0x0, metric 1
Summary *23.1.1.0 10.255.71.242 0x80000002 218 0x20 0x6d72 28
mask 255.255.255.0
TOS 0x0, metric 1
NSSA *33.1.1.1 10.255.71.242 0x80000001 268 0x28 0xeb3b 36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0

```

### show ospf database extensive

```

user@host> show ospf database extensive
 OSPF link state database, Area 0.0.0.1
Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.70.103 10.255.70.103 0x80000002 286 0x20 0x4112 48
bits 0x0, link count 2
id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
TOS count 0, TOS 0 metric 1
id 12.1.1.0, data 255.255.255.0, Type Stub (3)
TOS count 0, TOS 0 metric 1
Aging timer 00:55:14
Installed 00:04:43 ago, expires in 00:55:14
Last changed 00:04:43 ago, Change count: 2
Router *10.255.71.242 10.255.71.242 0x80000002 285 0x20 0x11b1 48
bits 0x3, link count 2
id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
TOS count 0, TOS 0 metric 1
id 12.1.1.0, data 255.255.255.0, Type Stub (3)
TOS count 0, TOS 0 metric 1
Gen timer 00:45:15
Aging timer 00:55:15
Installed 00:04:45 ago, expires in 00:55:15, sent 00:04:43 ago
Last changed 00:04:45 ago, Change count: 2, Ours
Summary *23.1.1.0 10.255.71.242 0x80000002 243 0x20 0x6d72 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:57
Aging timer 00:55:57
Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0 10.255.71.242 0x80000002 248 0x20 0x607e 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA *33.1.1.1 10.255.71.242 0x80000002 288 0x28 0x73bd 36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:48 ago
Last changed 00:04:48 ago, Change count: 2, Ours

 OSPF link state database, Area 0.0.0.2
Type ID Adv Rtr Seq Age Opt Cksum Len
Router 10.255.71.52 10.255.71.52 0x80000004 245 0x20 0xd021 36
bits 0x0, link count 1

```

```

id 23.1.1.1, data 23.1.1.2, Type Transit (2)
TOS count 0, TOS 0 metric 1
Aging timer 00:55:55
Installed 00:04:02 ago, expires in 00:55:55
Last changed 00:04:02 ago, Change count: 2
Router *10.255.71.242 10.255.71.242 0x80000003 244 0x20 0xe191 36
bits 0x3, link count 1
id 23.1.1.1, data 23.1.1.1, Type Transit (2)
TOS count 0, TOS 0 metric 1
Gen timer 00:45:56
Aging timer 00:55:56
Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
Last changed 00:04:04 ago, Change count: 2, Ours
Network *23.1.1.1 10.255.71.242 0x80000002 244 0x20 0x9c76 32
mask 255.255.255.0
attached router 10.255.71.242
attached router 10.255.71.52
Gen timer 00:45:56
Aging timer 00:55:56
Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
Last changed 00:04:04 ago, Change count: 1, Ours
Summary *12.1.1.0 10.255.71.242 0x80000001 288 0x20 0xfeec 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:04 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0 10.255.71.242 0x80000002 248 0x20 0x607e 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:04 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA *33.1.1.1 10.255.71.242 0x80000001 293 0x28 0xe047 36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0
Gen timer 00:45:07
Aging timer 00:55:07
Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:04 ago
Last changed 00:04:53 ago, Change count: 1, Ours

```

#### OSPF link state database, Area 0.0.0.3

| Type                                                           | ID             | Adv Rtr       | Seq        | Age | Opt  | Cksum  | Len |
|----------------------------------------------------------------|----------------|---------------|------------|-----|------|--------|-----|
| Router                                                         | 10.255.71.238  | 10.255.71.238 | 0x80000003 | 250 | 0x20 | 0x3942 | 36  |
| bits 0x0, link count 1                                         |                |               |            |     |      |        |     |
| id 24.1.1.1, data 24.1.1.2, Type Transit (2)                   |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                                    |                |               |            |     |      |        |     |
| Aging timer 00:55:50                                           |                |               |            |     |      |        |     |
| Installed 00:04:07 ago, expires in 00:55:50                    |                |               |            |     |      |        |     |
| Last changed 00:04:07 ago, Change count: 2                     |                |               |            |     |      |        |     |
| Router                                                         | *10.255.71.242 | 10.255.71.242 | 0x80000003 | 248 | 0x20 | 0xf37d | 36  |
| bits 0x3, link count 1                                         |                |               |            |     |      |        |     |
| id 24.1.1.1, data 24.1.1.1, Type Transit (2)                   |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                                    |                |               |            |     |      |        |     |
| Gen timer 00:45:52                                             |                |               |            |     |      |        |     |
| Aging timer 00:55:52                                           |                |               |            |     |      |        |     |
| Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago |                |               |            |     |      |        |     |
| Last changed 00:04:08 ago, Change count: 2, Ours               |                |               |            |     |      |        |     |
| Network                                                        | *24.1.1.1      | 10.255.71.242 | 0x80000002 | 248 | 0x20 | 0xc591 | 32  |

```

mask 255.255.255.0
attached router 10.255.71.242
attached router 10.255.71.238
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:08 ago, Change count: 1, Ours
Summary *12.1.1.0 10.255.71.242 0x80000001 288 0x20 0xfeec 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:13 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *23.1.1.0 10.255.71.242 0x80000002 243 0x20 0x6d72 28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:57
Aging timer 00:55:57
Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA *33.1.1.1 10.255.71.242 0x80000001 293 0x28 0xeb3b 36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0
Gen timer 00:45:07
Aging timer 00:55:07
Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:13 ago
Last changed 00:04:53 ago, Change count: 1, Ours

```

#### show ospf database summary

```

user@host> show ospf database summary
Area 0.0.0.1:
 2 Router LSAs
 2 Summary LSAs
 1 NSSA LSAs
Area 0.0.0.2:
 2 Router LSAs
 1 Network LSAs
 2 Summary LSAs
 1 NSSA LSAs
Area 0.0.0.3:
 2 Router LSAs
 1 Network LSAs
 2 Summary LSAs
 1 NSSA LSAs
Externals:
Interface fe-2/2/1.0:
Interface ge-0/3/2.0:
Interface so-0/1/2.0:
Interface so-0/1/2.0:

```

## show ospf3 database

**List of Syntax**    [Syntax on page 1797](#)  
                          [Syntax \(EX Series Switches and QFX Series\) on page 1797](#)

**Syntax**    show ospf3 database  
                  <brief | detail | extensive | summary>  
                  <advertising-router (*address* | self)>  
                  <area *area-id*>  
                  <external>  
                  <instance *instance-name*>  
                  <inter-area-prefix>  
                  <inter-area-router>  
                  <intra-area-prefix>  
                  <link>  
                  <link-local>  
                  <logical-system (all | *logical-system-name*)>  
                  <lsa-id *lsa-id*>  
                  <network>  
                  <nssa>  
                  <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
                  <router>

**Syntax (EX Series Switches and QFX Series)**    show ospf3 database  
                  <brief | detail | extensive | summary>  
                  <advertising-router (*address* | self)>  
                  <area *area-id*>  
                  <external>  
                  <instance *instance-name*>  
                  <inter-area-prefix>  
                  <inter-area-router>  
                  <intra-area-prefix>  
                  <link>  
                  <link-local>  
                  <lsa-id *lsa-id*>  
                  <network>  
                  <nssa>  
                  <router>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                  Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                  **realm** option introduced in Junos OS Release 9.2.  
                                  **advertising-router (*address* | *self*)** option introduced in Junos Release 9.5.  
                                  **advertising-router (*address* | *self*)** option introduced in Junos OS Release 9.5 for EX Series switches.  
                                  Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display the entries in the OSPF version 3 (OSPFv3) link-state database, which contains data about link-state advertisement (LSA) packets.

**Options**    **none**—Display standard information about all entries in the OSPFv3 link-state database.  
                  **brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**advertising-router** (*address* | *self*)—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.

**area** *area-id*—(Optional) Display the LSAs in a particular area.

**external**—(Optional) Display external LSAs.

**instance** *instance-name*—(Optional) Display all OSPF database information under the named routing instance.

**inter-area-prefix**—(Optional) Display information about interarea-prefix LSAs.

**inter-area-router**—(Optional) Display information about interarea-router LSAs.

**intra-area-prefix**—(Optional) Display information about intra-area-prefix LSAs.

**link**—(Optional) Display information about link LSAs.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system** (*all* | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id** *lsa-id*—(Optional) Display the LSA with the specified LSA identifier.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**realm** (*ipv4-multicast* | *ipv4-unicast* | *ipv6-multicast*)—(Optional) Display information about the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family other than IPv6 unicast, which is the default.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- [clear \(ospf | ospf3\) database on page 1764](#)

**List of Sample Output**

[show ospf3 database brief on page 1803](#)  
[show ospf3 database extensive on page 1803](#)  
[show ospf3 database summary on page 1806](#)

**Output Fields**

[Table 169 on page 1798](#) lists the output fields for the **show ospf3 database** command. Output fields are listed in the approximate order in which they appear.

**Table 169: show ospf3 database Output Fields**

| Field Name                                        | Field Description                                 | Level of Output               |
|---------------------------------------------------|---------------------------------------------------|-------------------------------|
| OSPF link state database, area <i>area-number</i> | Entries in the link-state database for this area. | <b>brief detail extensive</b> |



Table 169: show ospf3 database Output Fields (*continued*)

| Field Name                                                                    | Field Description                                                                                                                                                                                                                                                                                                                                                          | Level of Output        |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| OSPF AS SCOPE<br>link state database                                          | Entries in the AS scope link-state database.                                                                                                                                                                                                                                                                                                                               | brief detail extensive |
| OSPF Link-Local<br>link state database,<br>interface<br><i>interface-name</i> | Entries in the link-local link-state database for this interface.                                                                                                                                                                                                                                                                                                          | brief detail extensive |
| area                                                                          | Area number. Area 0.0.0.0 is the backbone area.                                                                                                                                                                                                                                                                                                                            | All levels             |
| Type                                                                          | Type of link advertisement: <b>Extern</b> , <b>InterArPfx</b> , <b>InterArRtr</b> , <b>IntraArPrx</b> , <b>Link</b> , <b>Network</b> , <b>NSSA</b> , or <b>Router</b> .                                                                                                                                                                                                    | brief detail extensive |
| ID                                                                            | Link identifier included in the advertisement. An asterisk (*) preceding the identifier marks database entries that originated from the local routing device.                                                                                                                                                                                                              | brief detail extensive |
| Adv Rtr                                                                       | Address of the routing device that sent the advertisement.                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Seq                                                                           | Link sequence number of the advertisement.                                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Age                                                                           | Time elapsed since the LSA was originated, in seconds.                                                                                                                                                                                                                                                                                                                     | brief detail extensive |
| Cksum                                                                         | Checksum value of the LSA.                                                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Len                                                                           | Length of the advertisement, in bytes.                                                                                                                                                                                                                                                                                                                                     | brief detail extensive |
| <b>Router (Router Link-State Advertisements)</b>                              |                                                                                                                                                                                                                                                                                                                                                                            |                        |
| bits                                                                          | Flags describing the routing device that generated the LSP.                                                                                                                                                                                                                                                                                                                | detail extensive       |
| Options                                                                       | Option bits carried in the router LSA.                                                                                                                                                                                                                                                                                                                                     | detail extensive       |
| <b>For Each Router Link</b>                                                   |                                                                                                                                                                                                                                                                                                                                                                            |                        |
| Type                                                                          | Type of interface. The value of all other output fields describing a routing device interface depends on the interface's type: <ul style="list-style-type: none"> <li>• <b>PointToPoint (1)</b>—Point-to-point connection to another routing device.</li> <li>• <b>Transit (2)</b>—Connection to a transit network.</li> <li>• <b>Virtual (4)</b>—Virtual link.</li> </ul> | detail extensive       |
| Loc-if-id                                                                     | Local interface ID assigned to the interface that uniquely identifies the interface with the routing device.                                                                                                                                                                                                                                                               | detail extensive       |
| Nbr-if-id                                                                     | Interface ID of the neighbor's interface for this routing device link.                                                                                                                                                                                                                                                                                                     | detail extensive       |
| Nbr-rtr-id                                                                    | Router ID of the neighbor routing device (for type 2 interfaces, the attached link's designated router).                                                                                                                                                                                                                                                                   | detail extensive       |
| Metric                                                                        | Cost of the router link.                                                                                                                                                                                                                                                                                                                                                   | detail extensive       |

Table 169: show ospf3 database Output Fields (*continued*)

| Field Name                                                     | Field Description                                                                                                                                                                                                                                            | Level of Output  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Gen timer                                                      | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                          | extensive        |
| Aging timer                                                    | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | extensive        |
| Installed <i>nn:nn:nn</i> ago                                  | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | extensive        |
| expires in <i>nn:nn:nn</i>                                     | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | extensive        |
| sent <i>nn:nn:nn</i> ago                                       | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | extensive        |
| Ours                                                           | Indicates that this is a local advertisement.                                                                                                                                                                                                                | extensive        |
| <b>Network (Network Link-State Advertisements)</b>             |                                                                                                                                                                                                                                                              |                  |
| Options                                                        | Option bits carried in the network LSA.                                                                                                                                                                                                                      | detail extensive |
| Attached Router                                                | Router IDs of each of the routing devices attached to the link. Only routing devices that are fully adjacent to the designated router are listed. The designated router includes itself in this list.                                                        | detail extensive |
| <b>InterArPfx (Interarea-Prefix Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                  |
| Prefix                                                         | IPv6 address prefix.                                                                                                                                                                                                                                         | detail extensive |
| Prefix-options                                                 | Option bit associated with the prefix.                                                                                                                                                                                                                       | detail extensive |
| Metric                                                         | Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range. | detail extensive |
| Gen timer                                                      | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                          | extensive        |
| Aging timer                                                    | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | extensive        |
| Installed <i>nn:nn:nn</i> ago                                  | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | extensive        |
| expires in <i>nn:nn:nn</i>                                     | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | extensive        |
| sent <i>nn:nn:nn</i> ago                                       | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | extensive        |
| Ours                                                           | Indicates that this is a local advertisement.                                                                                                                                                                                                                | extensive        |
| <b>InterArRtr (Interarea-Router Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                  |
| Dest-router-id                                                 | Router ID of the routing device described by the LSA.                                                                                                                                                                                                        | detail extensive |

Table 169: show ospf3 database Output Fields (*continued*)

| Field Name                                         | Field Description                                                                                                                                                                                                                                            | Level of Output         |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>options</b>                                     | Optional capabilities supported by the routing device.                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Metric</b>                                      | Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range. | <b>detail extensive</b> |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>extensive</b>        |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>extensive</b>        |
| <b>Extern (External Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                         |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Metric</b>                                      | Cost of the route, which depends on the value of <b>Type</b> .                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Type <i>n</i></b>                               | Type of external metric: <b>Type 1</b> or <b>Type 2</b> .                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Aging timer</b>                                 | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | <b>extensive</b>        |
| <b>Installed <i>nn:nn:nn</i> ago</b>               | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | <b>extensive</b>        |
| <b>expires in <i>nn:nn:nn</i></b>                  | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | <b>extensive</b>        |
| <b>sent <i>nn:nn:nn</i> ago</b>                    | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | <b>extensive</b>        |
| <b>Link (Link-State Advertisements)</b>            |                                                                                                                                                                                                                                                              |                         |
| <b>IPv6-Address</b>                                | IPv6 link-local address on the link for which this link LSA originated.                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Options</b>                                     | Option bits carried in the link LSA.                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>priority</b>                                    | Router priority of the interface attaching the originating routing device to the link.                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Prefix-count</b>                                | Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.                                                                                                              | <b>detail extensive</b> |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Gen timer</b>                                   | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                          | <b>extensive</b>        |

Table 169: show ospf3 database Output Fields (*continued*)

| Field Name                                                      | Field Description                                                                                                                                                                                                              | Level of Output  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Aging timer                                                     | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                   | extensive        |
| Installed <i>nn:nn:nn</i> ago                                   | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                             | extensive        |
| expires in <i>nn:nn:nn</i>                                      | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                 | extensive        |
| sent <i>nn:nn:nn</i> ago                                        | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                         | extensive        |
| Ours                                                            | Indicates that this is a local advertisement.                                                                                                                                                                                  | extensive        |
| <b>IntraArPfx (Intra-Area-Prefix Link-State Advertisements)</b> |                                                                                                                                                                                                                                |                  |
| Ref-lsa-type                                                    | LSA type of the referenced LSA. <ul style="list-style-type: none"> <li><b>Router</b>—Address prefixes are associated with a router LSA.</li> <li><b>Network</b>—Address prefixes are associated with a network LSA.</li> </ul> | detail extensive |
| Ref-lsa-id                                                      | Link-state ID of the referenced LSA.                                                                                                                                                                                           | detail extensive |
| Ref-router-id                                                   | Advertising router ID of the referenced LSA.                                                                                                                                                                                   | detail extensive |
| Prefix-count                                                    | Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.                                                                                | detail extensive |
| Prefix                                                          | IPv6 address prefix.                                                                                                                                                                                                           | detail extensive |
| Prefix-options                                                  | Option bit associated with the prefix.                                                                                                                                                                                         | detail extensive |
| Metric                                                          | Cost of this prefix. Expressed in the same units as the interface costs in the router LSAs.                                                                                                                                    | detail extensive |
| Gen timer                                                       | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                            | extensive        |
| Aging timer                                                     | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                   | extensive        |
| Installed <i>hh:mm:ss</i> ago                                   | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                             | extensive        |
| expires in <i>hh:mm:ss</i>                                      | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                 | extensive        |
| sent <i>hh:mm:ss</i> ago                                        | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                         | extensive        |
| <i>n</i> Router LSAs                                            | Number of router LSAs in the link-state database.                                                                                                                                                                              | summary          |
| <i>n</i> Network LSAs                                           | Number of network LSAs in the link-state database.                                                                                                                                                                             | summary          |

Table 169: show ospf3 database Output Fields (*continued*)

| Field Name                         | Field Description                                                        | Level of Output |
|------------------------------------|--------------------------------------------------------------------------|-----------------|
| <i>n</i> InterArPfx LSAs           | Number of interarea-prefix LSAs in the link-state database.              | summary         |
| <i>n</i> InterArRtr LSAs           | Number of interarea-router LSAs in the link-state database.              | summary         |
| <i>n</i> IntraArPfx LSAs           | Number of intra-area-prefix LSAs in the link-state database.             | summary         |
| Externals                          | Display of the external LSA database.                                    | summary         |
| <i>n</i> Extern LSAs               | Number of external LSAs in the link-state database.                      | summary         |
| Interface<br><i>interface-name</i> | Name of the interface for which link-local LSA information is displayed. | summary         |
| <i>n</i> Link LSAs                 | Number of link LSAs in the link-state database.                          | summary         |

## Sample Output

### show ospf3 database brief

```

user@host> show ospf3 database brief
 OSPF3 link state database, area 0.0.0.0
 Type ID Adv Rtr Seq Age Cksum Len
 Router 0.0.0.1 10.255.4.85 0x80000003 885 0xa697 40
 Router *0.0.0.1 10.255.4.93 0x80000002 953 0xc677 40
 InterArPfx *0.0.0.2 10.255.4.93 0x80000001 910 0xb96f 44
 InterArRtr *0.0.0.1 10.255.4.93 0x80000001 910 0xe159 32
 IntraArPfx *0.0.0.1 10.255.4.93 0x80000002 432 0x788f 72

 OSPF3 link state database, area 0.0.0.1
 Type ID Adv Rtr Seq Age Cksum Len
 Router *0.0.0.1 10.255.4.93 0x80000003 916 0xea40 40
 Router 0.0.0.1 10.255.4.97 0x80000006 851 0xc95b 40
 Network 0.0.0.2 10.255.4.97 0x80000002 916 0x4598 32
 InterArPfx *0.0.0.1 10.255.4.93 0x80000002 117 0xa980 44
 InterArPfx *0.0.0.2 10.255.4.93 0x80000002 62 0xd47e 44
 NSSA 0.0.0.1 10.255.4.97 0x80000002 362 0x45ee 44
 IntraArPfx 0.0.0.1 10.255.4.97 0x80000006 851 0x2f77 52

 OSPF3 AS SCOPE link state database
 Type ID Adv Rtr Seq Age Cksum Len
 Extern 0.0.0.1 10.255.4.85 0x80000002 63 0x9b86 44
 Extern *0.0.0.1 10.255.4.93 0x80000001 910 0x59c9 44

 OSPF3 Link-Local link state database, interface ge-1/3/0.0
 Type ID Adv Rtr Seq Age Cksum Len
 Link *0.0.0.2 10.255.4.93 0x80000003 916 0x4dab 64

```

### show ospf3 database extensive

```

user@host> show ospf3 database extensive
 OSPF3 link state database, area 0.0.0.0
 Type ID Adv Rtr Seq Age Cksum Len
 Router 0.0.0.1 10.255.4.85 0x80000003 1028 0xa697 40

```

```

bits 0x2, Options 0x13
Type PointToPoint (1), Metric 10
 Loc-If-Id 2, Nbr-If-Id 3, Nbr-Rtr-Id 10.255.4.93
Aging timer 00:42:51
Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
Router *0.0.0.1 10.255.4.93 0x80000002 1096 0xc677 40
bits 0x3, Options 0x13
Type PointToPoint (1), Metric 10
 Loc-If-Id 3, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.85
Gen timer 00:00:40
Aging timer 00:41:44
Installed 00:18:16 ago, expires in 00:41:44, sent 00:18:14 ago
Ours
InterArPfx *0.0.0.2 10.255.4.93 0x80000001 1053 0xb96f 44
Prefix feee::10:10:2:0/126
Prefix-options 0x0, Metric 10
Gen timer 00:17:02
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
InterArPfx *0.0.0.3 10.255.4.93 0x80000001 1053 0x71d3 44
Prefix feee::10:255:4:97/128
Prefix-options 0x0, Metric 10
Gen timer 00:21:07
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
InterArRtr *0.0.0.1 10.255.4.93 0x80000001 1053 0xe159 32
Dest-router-id 10.255.4.97, Options 0x19, Metric 10
Gen timer 00:29:18
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
IntraArPfx 0.0.0.1 10.255.4.85 0x80000002 1028 0x2403 72
Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.85
Prefix-count 2
Prefix feee::10:255:4:85/128
 Prefix-options 0x2, Metric 0
Prefix feee::10:10:1:0/126
 Prefix-options 0x0, Metric 10
Aging timer 00:42:51
Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
IntraArPfx *0.0.0.1 10.255.4.93 0x80000002 575 0x788f 72
Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.93
Prefix-count 2
Prefix feee::10:255:4:93/128
 Prefix-options 0x2, Metric 0
Prefix feee::10:10:1:0/126
 Prefix-options 0x0, Metric 10
Gen timer 00:33:23
Aging timer 00:50:24
Installed 00:09:35 ago, expires in 00:50:25, sent 00:09:33 ago
OSPF3 link state database, area 0.0.0.1
Type ID Adv Rtr Seq Age Cksum Len
Router *0.0.0.1 10.255.4.93 0x80000003 1059 0xea40 40
bits 0x3, Options 0x19
Type Transit (2), Metric 10
 Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
Gen timer 00:08:51
Aging timer 00:42:20
Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago

```

```

Router 0.0.0.1 10.255.4.97 0x80000006 994 0xc95b 40
 bits 0x2, Options 0x19
 Type Transit (2), Metric 10
 Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
 Aging timer 00:43:25
 Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
Network 0.0.0.2 10.255.4.97 0x80000002 1059 0x4598 32
 Options 0x11
 Attached router 10.255.4.97
 Attached router 10.255.4.93
 Aging timer 00:42:20
 Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
InterArPfx *0.0.0.1 10.255.4.93 0x80000002 260 0xa980 44
 Prefix feee::10:10:1:0/126
 Prefix-options 0x0, Metric 10
 Gen timer 00:45:39
 Aging timer 00:55:39
 Installed 00:04:20 ago, expires in 00:55:40, sent 00:04:18 ago
 Ours
InterArPfx *0.0.0.2 10.255.4.93 0x80000002 205 0xd47e 44
 Prefix feee::10:255:4:93/128
 Prefix-options 0x0, Metric 0
 Gen timer 00:46:35
 Aging timer 00:56:35
 Installed 00:03:25 ago, expires in 00:56:35, sent 00:03:23 ago
 Ours
InterArPfx *0.0.0.3 10.255.4.93 0x80000001 1089 0x9bbb 44
 Prefix feee::10:255:4:85/128
 Prefix-options 0x0, Metric 10
 Gen timer 00:04:46
 Aging timer 00:41:51
 Installed 00:18:09 ago, expires in 00:41:51, sent 00:17:43 ago
 Ours
NSSA 0.0.0.1 10.255.4.97 0x80000002 505 0x45ee 44
 Prefix feee::200:200:1:0/124
 Prefix-options 0x8, Metric 10, Type 2,
 Aging timer 00:51:35
 Installed 00:08:22 ago, expires in 00:51:35, sent 02:37:54 ago
IntraArPfx 0.0.0.1 10.255.4.97 0x80000006 994 0x2f77 52
 Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.97
 Prefix-count 1
 Prefix feee::10:255:4:97/128
 Prefix-options 0x2, Metric 0
 Aging timer 00:43:25
 Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
IntraArPfx 0.0.0.3 10.255.4.97 0x80000002 1059 0x4446 52
 Ref-lsa-type Network, Ref-lsa-id 0.0.0.2, Ref-router-id 10.255.4.97
 Prefix-count 1
 Prefix feee::10:10:2:0/126
 Prefix-options 0x0, Metric 0
 Aging timer 00:42:20
 Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
 OSPF3 AS SCOPE link state database
Type ID Adv Rtr Seq Age Cksum Len
Extern 0.0.0.1 10.255.4.85 0x80000002 206 0x9b86 44
 Prefix feee::100:100:1:0/124
 Prefix-options 0x0, Metric 20, Type 2,
 Aging timer 00:56:34
 Installed 00:03:23 ago, expires in 00:56:34, sent 02:37:54 ago
Extern *0.0.0.1 10.255.4.93 0x80000001 1053 0x59c9 44
 Prefix feee::200:200:1:0/124

```

```

Prefix-options 0x0, Metric 10, Type 2,
Gen timer 00:25:12
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago

```

```

OSPF3 Link-Local link state database, interface ge-1/3/0.0
Type ID Adv Rtr Seq Age Cksum Len
Link *0.0.0.2 10.255.4.93 0x80000003 1059 0x4dab 64
fe80::290:69ff:fe39:1cdb
Options 0x11, priority 128
Prefix-count 1
Prefix feee::10:10:2:0/126 Prefix-options 0x0
Gen timer 00:12:56
Aging timer 00:42:20
Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago
Link 0.0.0.2 10.255.4.97 0x80000003 205 0xa87d 64
fe80::290:69ff:fe38:883e
Options 0x11, priority 128
Prefix-count 1
Prefix feee::10:10:2:0/126 Prefix-options 0x0
Aging timer 00:56:35
Installed 00:03:22 ago, expires in 00:56:35, sent 02:37:54 ago

```

```

OSPF3 Link-Local link state database, interface so-2/2/0.0
Type ID Adv Rtr Seq Age Cksum Len
Link 0.0.0.2 10.255.4.85 0x80000002 506 0x42bb 64
fe80::280:42ff:fe10:f169
Options 0x13, priority 128
Prefix-count 1
Prefix feee::10:10:1:0/126 Prefix-options 0x0
Aging timer 00:51:34
Installed 00:08:23 ago, expires in 00:51:34, sent 02:37:54 ago
Link *0.0.0.3 10.255.4.93 0x80000002 505 0x6b7a 64
fe80::280:42ff:fe10:f177
Options 0x13, priority 128
Prefix-count 1
Prefix feee::10:10:1:0/126 Prefix-options 0x0
Gen timer 00:37:28
Aging timer 00:51:35
Installed 00:08:25 ago, expires in 00:51:35, sent 00:08:23 ago
Ours

```

### show ospf3 database summary

```

user@host> show ospf3 database summary
Area 0.0.0.0:
 2 Router LSAs
 1 InterArPfx LSAs
 1 InterArRtr LSAs
 1 IntraArPfx LSAs
Area 0.0.0.1:
 2 Router LSAs
 1 Network LSAs
 2 InterArPfx LSAs
 1 NSSA LSAs
 1 IntraArPfx LSAs
Externals:
 2 Extern LSAs
Interface ge-1/3/0.0:
 1 Link LSAs
Interface lo0.0:

```



Interface so-2/2/0.0:  
1 Link LSAs

```
show (ospf | ospf3) interface
```

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1808</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1808</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Syntax                                   | <pre>show (ospf   ospf3) interface &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;<i>interface-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Syntax (EX Series Switch and QFX Series) | <pre>show (ospf   ospf3) interface &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;<i>interface-name</i>&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Release Information                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>area</b> option introduced in Junos OS Release 9.2.</p> <p><b>area</b> option introduced in Junos OS Release 9.2 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description                              | Display the status of Open Shortest Path First (OSPF) interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Options                                  | <p><b>none</b>—Display standard information about the status of all OSPF interfaces for all routing instances</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display information about the interfaces that belong to the specified area.</p> <p><b><i>interface-name</i></b>—(Optional) Display information for the specified interface.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all OSPF interfaces under the named routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display information about the interfaces for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| Required Privilege Level                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**List of Sample Output** [show ospf interface brief on page 1811](#)  
[show ospf interface detail on page 1811](#)  
[show ospf3 interface detail on page 1811](#)  
[show ospf interface detail\(When Multiarea Adjacency Is Configured\) on page 1811](#)  
[show ospf interface area area-id on page 1813](#)  
[show ospf interface extensive \(When Flooding Reduction Is Enabled\) on page 1813](#)  
[show ospf interface extensive \(When LDP Synchronization Is Configured\) on page 1813](#)

**Output Fields** [Table 170 on page 1809](#) lists the output fields for the **show (ospf | ospf3) interface** command. Output fields are listed in the approximate order in which they appear.

**Table 170: show (ospf | ospf3) interface Output Fields**

| Field Name              | Field Description                                                                                                                                                                                    | Level of Output         |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Interface</b>        | Name of the interface running OSPF version 2 or OSPF version 3.                                                                                                                                      | All levels              |
| <b>State</b>            | State of the interface: <b>BDR</b> , <b>Down</b> , <b>DR</b> , <b>DRother</b> , <b>Loop</b> , <b>PtToPt</b> , or <b>Waiting</b> .                                                                    | All levels              |
| <b>Area</b>             | Number of the area that the interface is in.                                                                                                                                                         | All levels              |
| <b>DR ID</b>            | Address of the area's designated router.                                                                                                                                                             | All levels              |
| <b>BDR ID</b>           | Backup designated router for a particular subnet.                                                                                                                                                    | All levels              |
| <b>Nbrs</b>             | Number of neighbors on this interface.                                                                                                                                                               | All levels              |
| <b>Type</b>             | Type of interface: <b>LAN</b> , <b>NBMA</b> , <b>P2MP</b> , <b>P2P</b> , or <b>Virtual</b> .                                                                                                         | <b>detail extensive</b> |
| <b>Address</b>          | IP address of the neighbor.                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Mask</b>             | Netmask of the neighbor.                                                                                                                                                                             | <b>detail extensive</b> |
| <b>Prefix-length</b>    | (OSPFv3) IPv6 prefix length, in bits.                                                                                                                                                                | <b>detail extensive</b> |
| <b>OSPF3-Intf-Index</b> | (OSPFv3) OSPF version 3 interface index.                                                                                                                                                             | <b>detail extensive</b> |
| <b>MTU</b>              | Interface maximum transmission unit (MTU).                                                                                                                                                           | <b>detail extensive</b> |
| <b>Cost</b>             | Interface cost (metric).                                                                                                                                                                             | <b>detail extensive</b> |
| <b>DR addr</b>          | Address of the designated router.                                                                                                                                                                    | <b>detail extensive</b> |
| <b>BDR addr</b>         | Address of the backup designated router.                                                                                                                                                             | <b>detail extensive</b> |
| <b>Adj count</b>        | Number of adjacent neighbors.                                                                                                                                                                        | <b>detail extensive</b> |
| <b>Secondary</b>        | Indicates that this interface is configured as a secondary interface for this area. This interface can belong to more than one area, but can be designated as a primary interface for only one area. | <b>detail extensive</b> |

Table 170: show (ospf | ospf3) interface Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Flood Reduction</b> | Indicates that this interface is configured with flooding reduction. All self-originated LSAs from this interface are initially sent with the <b>DoNotAge</b> bit set. As a result, LSAs are refreshed only when a change occurs.                                                                                                                                                                                                                                   | <b>extensive</b>        |
| <b>Priority</b>        | Router priority used in designated router (DR) election on this interface.                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Flood list</b>      | List of link-state advertisements (LSAs) that might be about to flood this interface.                                                                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>        |
| <b>Ack list</b>        | Acknowledgment list. List of pending acknowledgments on this interface.                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>        |
| <b>Descriptor list</b> | List of packet descriptors.                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>        |
| <b>Hello</b>           | Configured value for the hello timer.                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Dead</b>            | Configured value for the dead timer.                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>Auth type</b>       | (OSPFv2) Authentication mechanism for sending and receiving OSPF protocol packets: <ul style="list-style-type: none"> <li>• <b>MD5</b>—The MD5 mechanism is configured in accordance with RFC 2328.</li> <li>• <b>None</b>—No authentication method is configured.</li> <li>• <b>Password</b>—A simple password (RFC 2328) is configured.</li> </ul>                                                                                                                | <b>detail extensive</b> |
| <b>Topology</b>        | (Multiarea adjacency) Name of topology: <b>default</b> or <b>name</b> .                                                                                                                                                                                                                                                                                                                                                                                             |                         |
| <b>LDP sync state</b>  | (OSPFv2 and LDP synchronization) Current state of LDP synchronization: <b>in sync</b> , <b>in holddown</b> , and <b>not supported</b> .                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>        |
| <b>reason</b>          | (OSPFv2 and LDP synchronization) Reason for the current state of LDP synchronization. The LDP session might be up or down, or adjacency might be up or down.                                                                                                                                                                                                                                                                                                        | <b>extensive</b>        |
| <b>config holdtime</b> | (OSPFv2 and LDP synchronization) Configured value of the hold timer.<br><br>If the state is not synchronized, and the hold time is not infinity, the <b>remaining</b> field displays the number of seconds that remain until the configured hold timer expires.                                                                                                                                                                                                     | <b>extensive</b>        |
| <b>IPSec SA name</b>   | (OSPFv2) Name of the IPSec security association name.                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Active key ID</b>   | (OSPFv2 and MD5) Number from <b>0</b> to <b>255</b> that uniquely identifies an MD5 key.                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Start time</b>      | (OSPFv2 and MD5) Time at which the routing device starts using an MD5 key to authenticate OSPF packets transmitted on the interface on which this key is configured. To authenticate received OSPF protocol packets, the key becomes effective immediately after the configuration is committed. If the start time option is not configured, the key is effective immediately for send and receive and is displayed as <b>Start time 1970 Jan 01 00:00:00 PST</b> . | <b>detail extensive</b> |

Table 170: show (ospf | ospf3) interface Output Fields (*continued*)

| Field Name                   | Field Description                          | Level of Output  |
|------------------------------|--------------------------------------------|------------------|
| ReXmit                       | Configured value for the Retransmit timer. | detail extensive |
| Stub, Not Stub, or Stub NSSA | Type of area.                              | detail extensive |

## Sample Output

### show ospf interface brief

```

user@host> show ospf interface brief
Intf State Area DR ID BDR ID Nbrs
at-5/1/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1
ge-2/3/0.0 DR 0.0.0.0 192.168.4.16 192.168.4.15 1
lo0.0 DR 0.0.0.0 192.168.4.16 0.0.0.0 0
so-0/0/0.0 Down 0.0.0.0 0.0.0.0 0.0.0.0 0
so-6/0/1.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1
so-6/0/2.0 Down 0.0.0.0 0.0.0.0 0.0.0.0 0
so-6/0/3.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1

```

### show ospf interface detail

```

user@host> show ospf interface detail
Interface State Area DR ID BDR ID Nbrs
fe-0/0/1.0 BDR 0.0.0.0 192.168.37.12 10.255.245.215 1
Type LAN, address 192.168.37.11, Mask 255.255.255.248, MTU 4460, Cost 40
DR addr 192.168.37.12, BDR addr 192.168.37.11, Adj count 1, Priority 128
Hello 10, Dead 40, ReXmit 5, Not Stub
t1-0/2/1.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 0
Type P2P, Address 0.0.0.0, Mask 0.0.0.0, MTU 1500, Cost 2604
Adj count 0
Hello 10, Dead 40, ReXmit 5, Not Stub
Auth type: MD5, Active key ID 3, Start time 2002 Nov 19 10:00:00 PST
IPsec SA Name: sa

```

### show ospf3 interface detail

```

user@host> show ospf3 interface so-0/0/3.0 detail
Interface State Area DR-ID BDR-ID Nbrs
so-0/0/3.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1
Address fe80::2a0:a5ff:fe28:1dfc, Prefix-length 64
OSPF3-Intf-index 1, Type P2P, MTU 4470, Cost 12, Adj-count 1
Hello 10, Dead 40, ReXmit 5, Not Stub

```

### show ospf interface detail (When Multiarea Adjacency Is Configured)

```

user@host> show ospf interface detail
user@host> show ospf interface detail
Interface State Area DR ID BDR ID Nbrs
lo0.0 DR 0.0.0.0 10.255.245.2 0.0.0.0 0

Type: LAN, Address: 127.0.0.1, Mask: 255.255.255.255, MTU: 65535, Cost: 0
DR addr: 127.0.0.1, Adj count: 0, Priority: 128
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None

```

```

Topology default (ID 0) -> Cost: 0
1o0.0 DR 0.0.0.0 10.255.245.2 0.0.0.0 0

Type: LAN, Address: 10.255.245.2, Mask: 255.255.255.255, MTU: 65535, Cost: 0
DR addr: 10.255.245.2, Adj count: 0, Priority: 128
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 0
so-0/0/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 0

Type: P2P, Address: 192.168.37.46, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-1/0/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 0

Type: P2P, Address: 192.168.37.54, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-0/0/0.0 PtToPt 1.1.1.1 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0 PtToPt 1.1.1.1 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0 PtToPt 2.2.2.2 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0 PtToPt 2.2.2.2 0.0.0.0 0.0.0.0 1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary

```

```

Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1

```

#### show ospf interface area area-id

```

user@host> show ospf interface area 1.1.1.1
Interface State Area DR ID BDR ID Nbrs
so-0/0/0.0 PtToPt 1.1.1.1 0.0.0.0 0.0.0.0 1
so-1/0/0.0 PtToPt 1.1.1.1 0.0.0.0 0.0.0.0 1

```

#### show ospf interface extensive (When Flooding Reduction Is Enabled)

```

user@host> show ospf interface extensive
Interface State Area DR ID BDR ID Nbrs
fe-0/0/0.0 PtToPt 0.0.0.0 0.0.0.0 0.0.0.0 0

Type: P2P, Address: 10.10.10.1, Mask: 255.255.255.0, MTU: 1500, Cost: 1
Adj count: 0
Secondary, Flood Reduction
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1

```

#### show ospf interface extensive (When LDP Synchronization Is Configured)

```

user@host> show ospf interface extensive
Interface State Area DR ID BDR ID
Nbrs
so-1/0/3.0 Down 0.0.0.0 0.0.0.0 0.0.0.0
0
Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 65535
Adj count: 0
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
LDP sync state: in holddown, for: 00:00:08, reason: LDP down during config
config holddtime: 10 seconds, remaining: 1

```

## show (ospf | ospf3) io-statistics

|                                                 |                                                                                                                                                                                                      |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1814</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1814</a>                                                                                         |
| <b>Syntax</b>                                   | show (ospf   ospf3) io-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                            |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show (ospf   ospf3) io-statistics                                                                                                                                                                    |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.             |
| <b>Description</b>                              | Display Open Shortest Path First (OSPF) input and output statistics.                                                                                                                                 |
| <b>Options</b>                                  | none—Display OSPF input and output statistics.<br><br>logical-system (all   <i>logical-system-name</i> )—(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                 |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><a href="#">clear (ospf   ospf3) statistics on page 1771</a></li> </ul>                                                                                       |
| <b>List of Sample Output</b>                    | <a href="#">show ospf io-statistics on page 1815</a>                                                                                                                                                 |
| <b>Output Fields</b>                            | Table 171 on page 1814 lists the output fields for the <b>show ospf io-statistics</b> command. Output fields are listed in the approximate order in which they appear.                               |

**Table 171: show (ospf | ospf3) io-statistics Output Fields**

| Field Name      | Field Description                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------|
| Packets read    | Number of OSPF packets read since the last time the routing protocol was started.                         |
| average per run | Total number of packets divided by the total number of times the OSPF read operation is scheduled to run. |
| max run         | Maximum number of packets for a given run among all scheduled runs.                                       |
| Receive errors  | Number of faulty packets received with errors.                                                            |



## Sample Output

### show ospf io-statistics

```
user@host> show ospf io-statistics
```

```
Packets read: 7361, average per run: 1.00, max run: 1
```

```
Receive errors:
```

```
None
```

## show (ospf | ospf3) log

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1816</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1816</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax</b>                                   | <pre>show (ospf   ospf3) log &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show (ospf   ospf3) log &lt;instance <i>instance-name</i>&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>topology</b> option introduced in Junos OS Release 9.0.</p> <p><b>topology</b> option introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>                              | Display the entries in the Open Shortest Path First (OSPF) log of SPF calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                  | <p><b>none</b>—Display entries in the OSPF log of SPF calculations for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display entries for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>topology <i>topology-name</i></b>—(Optional) (OSPFv2 only) Display entries for the specified topology.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(OSPFv3 only) (Optional) Display entries for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                    | <a href="#">show ospf log on page 1817</a><br><a href="#">show ospf log topology voice on page 1817</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>                            | <p><a href="#">Table 172 on page 1816</a> lists the output fields for the <b>show (ospf   ospf3) log</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 172: show (ospf | ospf3) log Output Fields**

| Field Name  | Field Description                                                                      |
|-------------|----------------------------------------------------------------------------------------|
| <b>When</b> | Time, in weeks ( <b>w</b> ) and days ( <b>d</b> ), since the SPF calculation was made. |

Table 172: show (ospf | ospf3) log Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                            |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type       | Type of calculation: Cleanup, External, Interarea, NSSA, Redist, SPF, Stub, Total, or VirtualLink.                                                                           |
| Elapsed    | Amount of time, in seconds, that elapsed during the operation, or the time required to complete the SPF calculation. The start time is the time displayed in the When field. |

## Sample Output

### show ospf log

```

user@host> show ospf log
When Type Elapsed
1w4d 17:25:58 Stub 0.000017
1w4d 17:25:58 SPF 0.000070
1w4d 17:25:58 Stub 0.000019
1w4d 17:25:58 Interarea 0.000054
1w4d 17:25:58 External 0.000005
1w4d 17:25:58 Cleanup 0.000203
1w4d 17:25:58 Total 0.000537
1w4d 17:24:48 SPF 0.000125
1w4d 17:24:48 Stub 0.000017
1w4d 17:24:48 SPF 0.000100
1w4d 17:24:48 Stub 0.000016
1w4d 17:24:48 Interarea 0.000056
1w4d 17:24:48 External 0.000005
1w4d 17:24:48 Cleanup 0.000238
1w4d 17:24:48 Total 0.000600
...

```

### show ospf log topology voice

```

user@host> show ospf log topology voice
Topology voice SPF log:

 Last instance of each event type
When Type Elapsed
00:06:11 SPF 0.000116
00:06:11 Stub 0.000114
00:06:11 Interarea 0.000126
00:06:11 External 0.000067
00:06:11 NSSA 0.000037
00:06:11 Cleanup 0.000186

 Maximum length of each event type
When Type Elapsed
00:13:43 SPF 0.000140
00:13:33 Stub 0.000116
00:13:43 Interarea 0.000128
00:13:33 External 0.000075
00:13:38 NSSA 0.000039
00:13:53 Cleanup 0.000657

```

Last 100 events

| When     | Type      | Elapsed  |
|----------|-----------|----------|
| 00:13:53 | SPF       | 0.000090 |
| 00:13:53 | Stub      | 0.000041 |
| 00:13:53 | Interarea | 0.000123 |
| 00:13:53 | External  | 0.000040 |
| 00:13:53 | NSSA      | 0.000038 |
| 00:13:53 | Cleanup   | 0.000657 |
| 00:13:53 | Total     | 0.001252 |
| .        |           |          |
| .        |           |          |
| 00:06:11 | SPF       | 0.000116 |
| 00:06:11 | Stub      | 0.000114 |
| 00:06:11 | Interarea | 0.000126 |
| 00:06:11 | External  | 0.000067 |
| 00:06:11 | NSSA      | 0.000037 |
| 00:06:11 | Cleanup   | 0.000186 |
| 00:06:11 | Total     | 0.000818 |

## show (ospf | ospf3) neighbor

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1819</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1819</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                                   | <pre>show (ospf   ospf3) neighbor &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;instance (all   <i>instance-name</i>)&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show (ospf   ospf3) neighbor &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;instance (all   <i>instance-name</i>)&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>instance all</b> option introduced in Junos OS Release 9.1.</p> <p><b>instance all</b> option introduced in Junos OS Release 9.1 for EX Series switches.</p> <p><b>area</b>, <b>interface</b>, and <b>realm</b> options introduced in Junos OS Release 9.2.</p> <p><b>area</b> and <b>interface</b> options introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>                              | Display information about Open Shortest Path First (OSPF) neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                  | <p><b>none</b>—Display standard information about all OSPF neighbors for all routing instances.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display information about the OSPF neighbors for the specified area.</p> <p><b>instance (all   <i>instance-name</i>)</b>—(Optional) Display all OSPF interfaces for all routing instances or under the named routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display information about OSPF neighbors for the specified logical interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor</b>—(Optional) Display information about the specified OSPF neighbor.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display information about the OSPF neighbors for the specified OSPFv3 realm, or address</p> |

family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**Required Privilege Level** view

**Related Documentation** • [clear \(ospf | ospf3\) neighbor on page 1768](#)

**List of Sample Output** [show ospf neighbor brief on page 1822](#)  
[show ospf neighbor detail on page 1822](#)  
[show ospf neighbor extensive on page 1823](#)  
[show ospf3 neighbor detail on page 1824](#)  
[show ospf neighbor area area-id on page 1824](#)  
[show ospf neighbor interface interface-name on page 1824](#)  
[show ospf3 neighbor instance all \(OSPFv3 Multiple Family Address Support Enabled\) on page 1824](#)

**Output Fields** [Table 173 on page 1820](#) lists the output fields for the **show (ospf | ospf3) neighbor** command. Output fields are listed in the approximate order in which they appear.

**Table 173: show (ospf | ospf3) neighbor Output Fields**

| Field Name       | Field Description                                  | Level of Output |
|------------------|----------------------------------------------------|-----------------|
| <b>Address</b>   | Address of the neighbor.                           | All levels      |
| <b>Interface</b> | Interface through which the neighbor is reachable. | All levels      |

Table 173: show (ospf | ospf3) neighbor Output Fields (*continued*)

| Field Name                            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output         |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>State</b>                          | <p>State of the neighbor:</p> <ul style="list-style-type: none"> <li>• <b>Attempt</b>—Valid only for neighbors attached to nonbroadcast networks. It indicates that no recent information has been received from the neighbor, but that a more concerted effort must be made to contact the neighbor.</li> <li>• <b>Down</b>—Initial state of a neighbor conversation. It indicates that no recent information has been received from the neighbor. Hello packets might continue to be sent to neighbors in the <b>Down</b> state, although at a reduced frequency.</li> <li>• <b>Exchange</b>—Routing device is describing its entire link-state database by sending database description packets to the neighbor. Each packet has a sequence number and is explicitly acknowledged.</li> <li>• <b>ExStart</b>—First step in creating an adjacency between the two neighboring routing devices. The goal of this step is to determine which routing device is the master, and to determine the initial sequence number.</li> <li>• <b>Full</b>—Neighboring routing devices are fully adjacent. These adjacencies appear in router link and network link advertisements.</li> <li>• <b>Init</b>—A hello packet has recently been sent by the neighbor. However, bidirectional communication has not yet been established with the neighbor. This state may occur, for example, because the routing device itself did not appear in the neighbor's hello packet.</li> <li>• <b>Loading</b>—Link-state request packets are sent to the neighbor to acquire more recent advertisements that have been discovered (but not yet received) in the <b>Exchange</b> state.</li> <li>• <b>2Way</b>—Communication between the two routing devices is bidirectional. This state has been ensured by the operation of the Hello Protocol. This is the most advanced state short of beginning adjacency establishment. The (backup) designated router is selected from the set of neighbors in state <b>2Way</b> or greater.</li> </ul> | All levels              |
| <b>ID</b>                             | Router ID of the neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels              |
| <b>Pri</b>                            | Priority of the neighbor to become the designated router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels              |
| <b>Dead</b>                           | Number of seconds until the neighbor becomes unreachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels              |
| <b>Link state acknowledgment list</b> | Number of link-state acknowledgments received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>        |
| <b>Link state retransmission list</b> | <p>Total number of link-state advertisements retransmitted. For <b>extensive</b> output only, the following information is also displayed:</p> <ul style="list-style-type: none"> <li>• <b>Type</b>—Type of link advertisement: <b>ASBR</b>, <b>Sum</b>, <b>Extern</b>, <b>Network</b>, <b>NSSA</b>, <b>OpaqArea</b>, <b>Router</b>, or <b>Summary</b>.</li> <li>• <b>LSA ID</b>—LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device.</li> <li>• <b>Adv rtr</b>—Address of the routing device that sent the advertisement.</li> <li>• <b>Seq</b>—Link sequence number of the advertisement.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |

Table 173: show (ospf | ospf3) neighbor Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                | Level of Output  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Neighbor-address</b> | (OSPFv3 only) If the neighbor uses virtual links, the <b>Neighbor-address</b> is the site-local, local, or global address. If the neighbor uses a physical interface, the <b>Neighbor-address</b> is an IPv6 link-local address. | detail extensive |
| <b>area</b>             | Area that the neighbor is in.                                                                                                                                                                                                    | detail extensive |
| <b>OSPF3-Intf-Index</b> | (OSPFv3 only) Displays the OSPFv3 interface index.                                                                                                                                                                               | detail extensive |
| <b>opt</b>              | Option bits received in the hello packets from the neighbor.                                                                                                                                                                     | detail extensive |
| <b>DR or DR-ID</b>      | Address of the designated router.                                                                                                                                                                                                | detail extensive |
| <b>BDR or BDR-ID</b>    | Address of the backup designated router.                                                                                                                                                                                         | detail extensive |
| <b>Up</b>               | Length of time since the neighbor came up.                                                                                                                                                                                       | detail extensive |
| <b>adjacent</b>         | Length of time since the adjacency with the neighbor was established.                                                                                                                                                            | detail extensive |

## Sample Output

### show ospf neighbor brief

```

user@host> show ospf neighbor brief
 Address Intf State ID Pri Dead
192.168.254.225 fxp3.0 2Way 10.250.240.32 128 36
192.168.254.230 fxp3.0 Full 10.250.240.8 128 38
192.168.254.229 fxp3.0 Full 10.250.240.35 128 33
10.1.1.129 fxp2.0 Full 10.250.240.12 128 37
10.1.1.131 fxp2.0 Full 10.250.240.11 128 38
10.1.2.1 fxp1.0 Full 10.250.240.9 128 32
10.1.2.81 fxp0.0 Full 10.250.240.10 128 33

```

### show ospf neighbor detail

```

user@host> show ospf neighbor detail
 Address Interface State ID Pri Dead
10.5.1.2 ge-1/2/0.1 Full 10.5.1.2 128 37
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:28, adjacent 05:17:36
Link state acknowledgment list: 3 entries

Link state retransmission list: 9 entries

10.5.10.2 ge-1/2/0.10 ExStart 10.5.1.38 128 34
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:28
master, seq 0xac1530f8, rexmit DBD in 3 sec
rexmit LSREQ in 0 sec
10.5.11.2 ge-1/2/0.11 Full 10.5.1.42 128 38
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:28, adjacent 05:26:46
Link state retransmission list: 1 entries

```



```

10.5.12.2 ge-1/2/0.12 ExStart 10.5.1.46 128 33
area 0.0.0.1, opt 0x42, DR 10.5.12.2, BDR 10.5.12.1
Up 06:09:28
master, seq 0xac188a68, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec

```

### show ospf neighbor extensive

```

user@host> show ospf neighbor extensive
Address Interface State ID Pri Dead
10.5.1.2 ge-1/2/0.1 Full 10.5.1.2 128 33
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:42, adjacent 05:17:50
Link state retransmission list:

 Type LSA ID Adv rtr Seq
 Summary 10.8.56.0 172.25.27.82 0x8000004d
 Router 10.5.1.94 10.5.1.94 0x8000005c
 Network 10.5.24.2 10.5.1.94 0x80000036
 Summary 10.8.57.0 172.25.27.82 0x80000024
 Extern 1.10.90.0 10.8.1.2 0x80000041
 Extern 1.4.109.0 10.6.1.2 0x80000041
 Router 10.5.1.190 10.5.1.190 0x8000005f
 Network 10.5.48.2 10.5.1.190 0x8000003d
 Summary 10.8.58.0 172.25.27.82 0x8000004d
 Extern 1.10.91.0 10.8.1.2 0x80000041
 Extern 1.4.110.0 10.6.1.2 0x80000041
 Router 10.5.1.18 10.5.1.18 0x8000005f
 Network 10.5.5.2 10.5.1.18 0x80000033
 Summary 10.8.59.0 172.25.27.82 0x8000003a
 Summary 10.8.62.0 172.25.27.82 0x80000025

10.5.10.2 ge-1/2/0.10 ExStart 10.5.1.38 128 38
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:42
master, seq 0xac1530f8, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec

10.5.11.2 ge-1/2/0.11 Full 10.5.1.42 128 33
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:42, adjacent 05:27:00
Link state retransmission list:

 Type LSA ID Adv rtr Seq
 Summary 10.8.58.0 172.25.27.82 0x8000004d

```

|         |           |              |            |
|---------|-----------|--------------|------------|
| Extern  | 1.10.91.0 | 10.8.1.2     | 0x80000041 |
| Extern  | 1.1.247.0 | 10.5.1.2     | 0x8000003f |
| Extern  | 1.4.110.0 | 10.6.1.2     | 0x80000041 |
| Router  | 10.5.1.18 | 10.5.1.18    | 0x8000005f |
| Network | 10.5.5.2  | 10.5.1.18    | 0x80000033 |
| Summary | 10.8.59.0 | 172.25.27.82 | 0x8000003a |

### show ospf3 neighbor detail

```
user@host> show ospf3 neighbor detail
ID Interface State Pri Dead
10.255.71.13 fe-0/0/2.0 Full 128 30
Neighbor-address fe80::290:69ff:fe9b:e002
area 0.0.0.0, opt 0x13, OSPF3-Intf-Index 2
DR-ID 10.255.71.13, BDR-ID 10.255.71.12
Up 02:51:43, adjacent 02:51:43
```

### show ospf neighbor area area-id

```
user@host >show ospf neighbor area 1.1.1.1
Address Interface State ID Pri Dead
192.168.37.47 so-0/0/0.0 Full 10.255.245.4 128 33
Area 1.1.1.1
192.168.37.55 so-1/0/0.0 Full 10.255.245.5 128 37
Area 1.1.1.1
```

### show ospf neighbor interface interface-name

```
user@host >show ospf neighbor interface so-0/0/0.0
Address Interface State ID Pri Dead
192.168.37.47 so-0/0/0.0 Full 10.255.245.4 128 37
Area 0.0.0.0
192.168.37.47 so-0/0/0.0 Full 10.255.245.4 128 33
Area 1.1.1.1
192.168.37.47 so-0/0/0.0 Full 10.255.245.4 128 32
Area 2.2.2.2
```

### show ospf3 neighbor instance all (OSPFv3 Multiple Family Address Support Enabled)

```
user @host > show ospf3 neighbor instance all
Instance: ina
Realm: ipv6-unicast
ID Interface State Pri Dead
100.1.1.1 fe-0/0/2.0 Full 128 37
Neighbor-address fe80::217:cb00:c87c:8c03
Instance: inb
Realm: ipv4-unicast
ID Interface State Pri Dead
100.1.2.1 fe-0/0/2.1 Full 128 33
Neighbor-address fe80::217:cb00:c97c:8c03
```

## show (ospf | ospf3) overview

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1825</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1825</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                   | <pre>show (ospf   ospf3) overview &lt;brief   extensive&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show (ospf   ospf3) overview &lt;brief   extensive&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                      | <p>Command introduced in Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Database protection introduced in Junos 10.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>                              | Display Open Shortest Path First (OSPF) overview information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                                  | <p><b>none</b>—Display standard information about all OSPF neighbors for all routing instances.</p> <p><b>brief   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all OSPF interfaces under the named routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display information about the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                    | <a href="#">show ospf overview on page 1827</a><br><a href="#">show ospf overview (With Database Protection) on page 1828</a><br><a href="#">show ospf3 overview (With Database Protection) on page 1828</a><br><a href="#">show ospf overview extensive on page 1828</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>                            | <p><a href="#">Table 174 on page 1826</a> lists the output fields for the <b>show ospf overview</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 174: show ospf overview Output Fields

| Field name                       | Field Description                                                                                                                                                                        | Level of Output |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Instance</b>                  | OSPF routing instance.                                                                                                                                                                   | All levels      |
| <b>Router ID</b>                 | Router ID of the routing device.                                                                                                                                                         | All levels      |
| <b>Route table index</b>         | Route table index.                                                                                                                                                                       | All levels      |
| <b>Configured overload</b>       | Overload capability is enabled. If the overload timer is also configured, display the time that remains before it is set to expire. This field is not displayed after the timer expires. | All levels      |
| <b>Topology</b>                  | Topology identifier.                                                                                                                                                                     | All levels      |
| <b>Prefix export count</b>       | Number of prefixes exported into OSPF.                                                                                                                                                   | All levels      |
| <b>Full SPF runs</b>             | Number of complete Shortest Path First calculations.                                                                                                                                     | All levels      |
| <b>SPF delay</b>                 | Delay before performing consecutive Shortest Path First calculations.                                                                                                                    | All levels      |
| <b>SPF holddown</b>              | Delay before performing additional Shortest Path First (SPF) calculations after the maximum number of consecutive SPF calculations is reached.                                           | All levels      |
| <b>SPF rapid runs</b>            | Maximum number of Shortest Path First calculations that can be performed in succession before the hold-down timer begins.                                                                | All levels      |
| <b>LSA refresh time</b>          | Refresh period for link-state advertisement (in minutes).                                                                                                                                | All levels      |
| <b>Database protection state</b> | Current state of database protection.                                                                                                                                                    | All levels      |
| <b>Warning threshold</b>         | Threshold at which a warning message is logged (percentage of maximum LSA count).                                                                                                        | All levels      |
| <b>Non self-generated LSAs</b>   | Number of LSAs whose router ID is not equal to the local router ID: <b>Current</b> , <b>Warning</b> (threshold), and <b>Allowed</b> .                                                    | All levels      |
| <b>Ignore time</b>               | How long the database has been in the ignore state.                                                                                                                                      | All levels      |
| <b>Reset time</b>                | How long the database must stay out of the ignore or isolated state before it returns to normal operations.                                                                              | All levels      |
| <b>Ignore count</b>              | Number of times the database has been in the ignore state: <b>Current</b> and <b>Allowed</b> .                                                                                           | All levels      |
| <b>Restart</b>                   | Graceful restart capability: <b>enabled</b> or <b>disabled</b> .                                                                                                                         | All levels      |
| <b>Restart duration</b>          | Time period for complete reacquisition of OSPF neighbors.                                                                                                                                | All levels      |
| <b>Restart grace period</b>      | Time period for which the neighbors should consider the restarting routing device as part of the topology.                                                                               | All levels      |

Table 174: show ospf overview Output Fields (*continued*)

| Field name                    | Field Description                                                                                                                                    | Level of Output  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Graceful restart helper mode  | (OSPFv2) Standard graceful restart helper capability (based on RFC 3623): <b>enabled</b> or <b>disabled</b> .                                        | All levels       |
| Restart-signaling helper mode | (OSPFv2) Restart signaling-based graceful restart helper capability (based on RFC 4811, RFC 4812, and RFC 4813): <b>enabled</b> or <b>disabled</b> . | All levels       |
| Helper mode                   | (OSPFv3) Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .                                                                     | All levels       |
| Trace options                 | OSPF-specific trace options.                                                                                                                         | <b>extensive</b> |
| Trace file                    | Name of the file to receive the output of the tracing operation.                                                                                     | <b>extensive</b> |
| Area                          | Area number. Area 0.0.0.0 is the backbone area.                                                                                                      | All levels       |
| Stub type                     | Stub type of area: <b>Normal Stub</b> , <b>Not Stub</b> , or <b>Not so Stubby Stub</b> .                                                             | All levels       |
| Authentication Type           | Type of authentication: <b>None</b> , <b>Password</b> , or <b>MD5</b> .                                                                              | All levels       |
| Area border routers           | Number of area border routers.                                                                                                                       | All levels       |
| Neighbors                     | Number of autonomous system boundary routers.                                                                                                        | All levels       |

## Sample Output

### show ospf overview

```

user@host> show ospf overview
Instance: master
 Router ID: 10.255.245.6
 Route table index: 0
 Configured overload, expires in 118 seconds
 LSA refresh time: 50 minutes
Restart: Enabled
 Restart duration: 20 sec
 Restart grace period: 40 sec
 Helper mode: enabled
Area: 0.0.0.0
 Stub type: Not Stub
 Authentication Type: None
 Area border routers: 0, AS boundary routers: 0
 Neighbors
 Up (in full state): 0
Topology: default (ID 0)
 Prefix export count: 0
 Full SPF runs: 1
 SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3

```

### show ospf overview (With Database Protection)

```
user@host> show ospf overview
Instance: master
Router ID: 10.255.112.218
Route table index: 0
LSA refresh time: 50 minutes
Traffic engineering
Restart: Enabled
 Restart duration: 180 sec
 Restart grace period: 210 sec
 Graceful restart helper mode: Enabled
 Restart-signaling helper mode: Enabled
Database protection state: Normal
Warning threshold: 70 percent
Non self-generated LSAs: Current 582, Warning 700, Allowed 1000
Ignore time: 30, Reset time: 60
Ignore count: Current 0, Allowed 1
Area: 0.0.0.0
 Stub type: Not Stub
 Authentication Type: None
 Area border routers: 0, AS boundary routers: 0
 Neighbors
 Up (in full state): 160
Topology: default (ID 0)
Prefix export count: 0
Full SPF runs: 70
SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
Backup SPF: Not Needed
```

### show ospf3 overview (With Database Protection)

```
user@host> show ospf3 overview
Instance: master
Router ID: 10.255.112.128
Route table index: 0
LSA refresh time: 50 minutes
Database protection state: Normal
Warning threshold: 80 percent
Non self-generated LSAs: Current 3, Warning 8, Allowed 10
Ignore time: 30, Reset time: 60
Ignore count: Current 0, Allowed 2
Area: 0.0.0.0
 Stub type: Not Stub
 Area border routers: 0, AS boundary routers: 0
 Neighbors
 Up (in full state): 1
Topology: default (ID 0)
Prefix export count: 0
Full SPF runs: 7
SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
Backup SPF: Not Needed
```

### show ospf overview extensive

```
user@host> show ospf overview extensive
Instance: master
Router ID: 1.1.1.103
Route table index: 0
Full SPF runs: 13, SPF delay: 0.200000 sec
LSA refresh time: 50 minutes
```

```
Restart: Disabled
Trace options: lsa
Trace file: /var/log/ospf size 131072 files 10
Area: 0.0.0.0
 Stub type: Not Stub
 Authentication Type: None
 Area border routers: 0, AS boundary routers: 0
 Neighbors
 Up (in full state): 1
```

## show (ospf | ospf3) route

---

**List of Syntax**    [Syntax on page 1830](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 1830](#)

**Syntax**    show (ospf | ospf3) route  
              <brief | detail | extensive>  
              <abr | asbr | extern | inter | intra>  
              <destination>  
              <instance (default | ipv4-multicast | *instance-name*)>  
              <logical-system (default | ipv4-multicast | *logical-system-name*)>  
              <network>  
              <no-backup-coverage>  
              <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
              <router>  
              <topology (default | ipv4-multicast | *topology-name*)>  
              <transit>

**Syntax (EX Series Switch and QFX Series)**    show (ospf | ospf3) route  
                                                          <brief | detail | extensive>  
                                                          <abr | asbr | extern | inter | intra>  
                                                          <destination>  
                                                          <instance *instance-name*>  
                                                          <network>  
                                                          <no-backup-coverage>  
                                                          <router>  
                                                          <topology (default | ipv4-multicast | *topology-name*)>  
                                                          <transit>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              **topology** option introduced in Junos OS Release 9.0.  
                              **realm** option introduced in Junos OS Release 9.2.  
                              Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display the entries in the Open Shortest Path First (OSPF) routing table.

**Options**    **none**—Display standard information about all entries in the OSPF routing table for all routing instances and all topologies.

**destination**—Display routes to the specified IP address (with optional destination prefix length).

**brief | detail | extensive**—(Optional) Display the specified level of output.

**abr**—(Optional) Display routes to area border routers.

**asbr**—(Optional) Display routes to autonomous system border routers.

**extern**—(Optional) Display external routes.

**inter**—(Optional) Display interarea routes.



**intra**—(Optional) Display intra-area routes.

**instance** (**default** | **ipv4-multicast** | *instance-name*)—(Optional) Display entries for the default routing instance, the IPv4 multicast routing instance, or for the specified routing instance.

**logical-system** (**default** | **ipv4-multicast** | *logical-system-name*)—(Optional) Perform this operation on the default logical system, the IPv4 multicast logical system, or on a particular logical system.

**network**—(Optional) Display routes to networks.

**no-backup-coverage**—(Optional) Display routes with no backup coverage.

**realm** (**ipv4-multicast** | **ipv4-unicast** | **ipv6-multicast**)—(OSPFv3 only) (Optional) Display entries in the routing table for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**router**—(Optional) Display routes to all routers.

**topology** (**default** | **ipv4-multicast** | *topology-name*)—(OSPFv2 only) (Optional) Display routes for the default OSPF topology, IPv4 multicast topology, or for a particular topology.

**transit**—(Optional) (OSPFv3 only) Display OSPFv3 routes to pseudonodes.

**Required Privilege Level**

view

**List of Sample Output**

[show ospf route on page 1833](#)  
[show ospf route detail on page 1833](#)  
[show ospf3 route on page 1833](#)  
[show ospf3 route detail on page 1834](#)  
[show ospf route topology voice on page 1834](#)

**Output Fields**

[Table 175 on page 1831](#) list the output fields for the **show (ospf | ospf3) route** command. Output fields are listed in the approximate order in which they appear.

**Table 175: show (ospf | ospf3) route Output Fields**

| Field Name      | Field Description         | Output Level |
|-----------------|---------------------------|--------------|
| <b>Topology</b> | Name of the topology.     | All levels   |
| <b>Prefix</b>   | Destination of the route. | All levels   |

Table 175: show (ospf | ospf3) route Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Output Level |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Path type</b>          | How the route was learned: <ul style="list-style-type: none"> <li>• <b>Inter</b>—Interarea route</li> <li>• <b>Ext1</b>—External type 1 route</li> <li>• <b>Ext2</b>—External type 2 route</li> <li>• <b>Intra</b>—Intra-area route</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              | All levels   |
| <b>Route type</b>         | The type of routing device from which the route was learned: <ul style="list-style-type: none"> <li>• <b>AS BR</b>—Route to AS border router.</li> <li>• <b>Area BR</b>—Route to area border router.</li> <li>• <b>Area/AS BR</b>—Route to router that is both an <b>Area BR</b> and <b>AS BR</b>.</li> <li>• <b>Network</b>—Network router.</li> <li>• <b>Router</b>—Route to a router that is neither an <b>Area BR</b> nor an <b>AS BR</b>.</li> <li>• <b>Transit</b>—(OSPFv3 only) Route to a pseudonode representing a transit network, LAN, or nonbroadcast multiaccess (NBMA) link.</li> <li>• <b>Discard</b>—Route to a summary discard.</li> </ul> | All levels   |
| <b>NH Type</b>            | Next-hop type: <b>LSP</b> or <b>IP</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels   |
| <b>Metric</b>             | Route's metric value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels   |
| <b>NH-interface</b>       | (OSPFv3 only) Interface through which the route's next hop is reachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels   |
| <b>NH-addr</b>            | (OSPFv3 only) IPv6 address of the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels   |
| <b>NextHop Interface</b>  | (OSPFv2 only) Interface through which the route's next hop is reachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels   |
| <b>Nexthop addr/label</b> | (OSPFv2 only) If the <b>NH Type</b> is <b>IP</b> , then it is the address of the next hop. If the <b>NH Type</b> is <b>LSP</b> , then it is the name of the label-switched path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels   |
| <b>Area</b>               | Area ID of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail       |
| <b>Origin</b>             | Router from which the route was learned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | detail       |
| <b>Type 7</b>             | Route was learned through a not-so-stubby area (NSSA) link-state advertisement (LSA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail       |
| <b>P-bit</b>              | Route was learned through NSSA LSA and the propagate bit was set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | detail       |
| <b>Fwd NZ</b>             | Forwarding address is nonzero. <b>Fwd NZ</b> is only displayed if the route is learned through an NSSA LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | detail       |

Table 175: show (ospf | ospf3) route Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Output Level  |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>optional-capability</b> | Optional capabilities propagated in the router LSA. This field is in the output for intra-area router routes only (when <b>Route Type</b> is <b>Area BR</b> , <b>AS BR</b> , <b>Area/AS BR</b> , or <b>Router</b> ), not for interarea router routes or network routes. Three bits in this field are defined as follows: <ul style="list-style-type: none"> <li>• <b>0x4 (V)</b>—Routing device is at the end of a virtual active link.</li> <li>• <b>0x2 (E)</b>—Routing device is an autonomous system boundary router.</li> <li>• <b>0x1 (B)</b>—Routing device is an area border router.</li> </ul> | <b>detail</b> |
| <b>priority</b>            | The priority assigned to the prefix: <ul style="list-style-type: none"> <li>• <b>high</b></li> <li>• <b>medium</b></li> <li>• <b>low</b></li> </ul> <p><b>NOTE:</b> The <b>priority</b> field applies only to routes of type <b>Network</b>.</p>                                                                                                                                                                                                                                                                                                                                                        | <b>detail</b> |

## Sample Output

### show ospf route

```

user@host> show ospf route
Prefix Path Route NH Metric NextHop Nexthop
 Type Type Type Interface addr/label
10.255.71.12 Intra Router IP 1 fe-0/0/2.0 192.16.22.86
10.255.71.13/32 Intra Network IP 0 lo0.0
192.168.222.84/30 Intra Network LSP 1 fe-0/0/2.0 1sp-ab

```

### show ospf route detail

```

user@host> show ospf route detail
Topology default Route Table:

Prefix Path Route NH Metric NextHop Nexthop
 Type Type Type Interface addr/label
10.255.14.174 Inter AS BR IP 210 t1-3/0/1.0
 area 0.0.0.2, origin 10.255.14.185
10.255.14.178 Intra Router IP 200 t3-3/1/3.0
 area 0.0.0.2, origin 10.255.14.178, optional-capability 0x0
10.210.1.0/30 Intra Network IP 10 t3-3/1/2.0
 area 0.0.0.2, origin 10.255.14.172, priority medium
100.1.1.1/32 Inter Network IP 210 t1-3/0/1.0
 area 0.0.0.2, origin 10.255.14.185, priority low
112.3.1.0/24 Ext2 Network IP 0 t1-3/0/1.0
 area 0.0.0.0, origin 10.255.14.174, priority high
200.3.3.0/30 Inter Network IP 220 t1-3/0/1.0
 area 0.0.0.2, origin 10.255.14.185, priority high

```

### show ospf3 route

```

user@host> show ospf3 route
Prefix Path Route NH Metric NextHop Nexthop
 Type Type Type Interface addr/label

```

```

10.255.71.13 Intra Router IP 1
NH-interface fe-0/0/2.0, NH-addr fe80::290:69ff:fe9b:e002
10.255.71.13;0.0.0.2
10.255.245.1 Intra Router IP 40 fxp1.1 192.168.36.17

area 0.0.0.0, origin 10.255.245.1 optional-capability 0x0,
10.255.245.3 Intra AS BR IP 1 fxp2.3 192.168.36.34

area 0.0.0.0, origin 10.255.245.3 optional-capability 0x0,
10.255.245.1/32 Intra Network IP 40 fxp1.1 192.168.36.17

area 0.0.0.0, origin 10.255.245.1, priority high
10.255.245.2/32 Intra Network IP 0 lo0.0
area 0.0.0.0, origin 10.255.245.2, priority medium
10.255.245.3/32 Intra Network IP 1 fxp2.3 192.168.36.34

area 0.0.0.0, origin 10.255.245.3, priority low
Intra Transit IP 1
NH-interface fe-0/0/2.0
192::168:222:84/126 Intra Network IP 1
NH-interface fe-0/0/2.0
abcd::71:12/128 Intra Network IP 0
NH-interface lo0.0
abcd::71:13/128 Intra Network LSP 1
NH-interface fe-0/0/2.0, NH-addr lsp-cd

```

#### show ospf3 route detail

```

user@host> show ospf3 route detail
Prefix Path Route NH Metric
type type type
10.255.14.174 Intra Area/AS BR IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Optional-capability 0x3
10.255.14.178 Intra Router IP 200
NH-interface t3-3/1/3.0
Area 0.0.0.0, Origin 10.255.14.178, Optional-capability 0x0
10.255.14.185;0.0.0.2 Intra Transit IP 200
NH-interface t1-3/0/1.0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.185
1000:1:1::1/128 Inter Network IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Priority low
1001:2:1::/48 Ext1 Network IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority medium
1002:1:7::/48 Ext2 Network IP 0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority low
1002:3:4::/48 Ext2 Network IP 0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority high
abcd::10:255:14:172/128 Intra Network IP 0
NH-interface lo0.0
Area 0.0.0.0, Origin 10.255.14.172, Priority low

```

#### show ospf route topology voice

```

user@host show ospf route topology voice

```

## Topology voice Route Table:

| Prefix          | Path<br>Type | Route<br>Type | NH<br>Type | Metric | NextHop<br>Interface | Nexthop<br>addr/label |
|-----------------|--------------|---------------|------------|--------|----------------------|-----------------------|
| 10.255.8.2      | Intra        | Router        | IP         | 1      | so-0/2/0.0           |                       |
| 10.255.8.3      | Intra        | Router        | IP         | 2      | so-0/2/0.0           |                       |
| 10.255.8.1/32   | Intra        | Network       | IP         | 0      | lo0.0                |                       |
| 10.255.8.2/32   | Intra        | Network       | IP         | 1      | so-0/2/0.0           |                       |
| 10.255.8.3/32   | Intra        | Network       | IP         | 2      | so-0/2/0.0           |                       |
| 192.168.8.0/29  | Intra        | Network       | IP         | 2      | so-0/2/0.0           |                       |
| 192.168.8.44/30 | Intra        | Network       | IP         | 2      | so-0/2/0.0           |                       |
| 192.168.8.46/32 | Intra        | Network       | IP         | 1      | so-0/2/0.0           |                       |
| 192.168.8.48/30 | Intra        | Network       | IP         | 1      | so-0/2/1.0           |                       |
| 192.168.8.52/30 | Intra        | Network       | IP         | 2      | so-0/2/0.0           |                       |
| 192.168.9.44/30 | Intra        | Network       | IP         | 1      | so-0/2/0.0           |                       |
| 192.168.9.45/32 | Intra        | Network       | IP         | 2      | so-0/2/0.0           |                       |

## show (ospf | ospf3) statistics

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1836</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1836</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Syntax                                   | <code>show (ospf   ospf3) statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                  |
| Syntax (EX Series Switch and QFX Series) | <code>show (ospf   ospf3) statistics</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Release Information                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                         |
| Description                              | Display OSPF statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Options                                  | <b>none</b> —Display OSPF statistics for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display all statistics for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b> —(Optional) (OSPFv3 only) Display all statistics for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default. |
| Required Privilege Level                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Related Documentation                    | <ul style="list-style-type: none"><li><a href="#">clear (ospf   ospf3) statistics on page 1771</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| List of Sample Output                    | <a href="#">show ospf statistics on page 1838</a><br><a href="#">show ospf statistics logical-system all on page 1838</a><br><a href="#">show ospf3 statistics on page 1839</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Output Fields                            | <a href="#">Table 176 on page 1836</a> lists the output fields for the <b>show (ospf   ospf3) statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 176: show (ospf | ospf3) statistics Output Fields

| Field Name                | Field Description                          |
|---------------------------|--------------------------------------------|
| Packet type               | Type of OSPF packet.                       |
| Total Sent/Total Received | Total number of packets sent and received. |

Table 176: show (ospf | ospf3) statistics Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Last 5 seconds Sent/Last 5 seconds Received | Total number of packets sent and received in the last 5 seconds.                                                                                                                                                                                                                                                                                                                |
| DBDs retransmitted                          | Total number of database description packets retransmitted, and number retransmitted in the last 5 seconds.                                                                                                                                                                                                                                                                     |
| LSAs flooded                                | Total number of link-state advertisements flooded, and number flooded in the last 5 seconds.                                                                                                                                                                                                                                                                                    |
| LSAs flooded high-prio                      | <p>Total number of high priority link-state advertisements flooded, and number flooded in the last 5 seconds.</p> <p>A link-state advertisement is deemed a high priority if it has changed since it was last sent.</p>                                                                                                                                                         |
| LSAs retransmitted                          | Total number of link-state advertisements retransmitted, and number retransmitted in the last 5 seconds.                                                                                                                                                                                                                                                                        |
| LSAs transmitted to nbr                     | Total number of link-state advertisements transmitted to a neighbor, and number transmitted in the last 5 seconds.                                                                                                                                                                                                                                                              |
| LSAs requested                              | Total number of link-state advertisements requested by neighboring devices, and number requested in the last 5 seconds.                                                                                                                                                                                                                                                         |
| LSAs acknowledged                           | Total number of link-state advertisements acknowledged, and number acknowledged in the last 5 seconds.                                                                                                                                                                                                                                                                          |
| Flood queue depth                           | Total number of entries in the extended queue.                                                                                                                                                                                                                                                                                                                                  |
| Total rexmit entries                        | Total number of retransmission entries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                                       |
| db summaries                                | Total number of database description summaries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                               |
| lsreq entries                               | Total number of link-state request entries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                                   |
| Receive errors                              | <p>Number and type of receive errors. Some sample receive errors include:</p> <ul style="list-style-type: none"> <li>• mtu mismatches</li> <li>• no interface found</li> <li>• no virtual link found</li> <li>• nssa mismatches</li> <li>• stub area mismatches</li> <li>• subnet mismatches</li> </ul> <p>If there are no receive errors, the output displays <b>none</b>.</p> |

## Sample Output

### show ospf statistics

```

user@host> show ospf statistics
Packet type Total
 Sent Received
Hello 31 14
 DbD 9 10
 LSReq 2 2
LSUpdate 8 16
 LSAck 9 9
 Last 5 seconds
 Sent Received
Hello 2 2
 DbD 0 0
 LSReq 0 0
LSUpdate 0 0
 LSAck 0 0

DBDs retransmitted : 3, last 5 seconds : 0
LSAs flooded : 12, last 5 seconds : 0
LSAs flooded high-prio : 0, last 5 seconds : 0
LSAs retransmitted : 0, last 5 seconds : 0
LSAs transmitted to nbr: 3, last 5 seconds : 0
LSAs requested : 5, last 5 seconds : 0
LSAs acknowledged : 19, last 5 seconds : 0

Flood queue depth : 0
Total rexmit entries : 0
db summaries : 0
lsreq entries : 0

Receive errors:
 862 no interface found
 115923 no virtual link found

```

### show ospf statistics logical-system all

```

user@host> show ospf statistics logical-system all
logical-system: C
OSPF instance is not running

logical-system: B
Packet type Total
 Sent Received
Hello 313740 313653
 DbD 3 2
 LSReq 1 1
LSUpdate 2752 1825
 LSAck 1821 2747
 Last 5 seconds
 Sent Received
Hello 1 0
 DbD 0 0
 LSReq 0 0
LSUpdate 0 0
 LSAck 0 0

DBDs retransmitted : 0, last 5 seconds : 0
LSAs flooded : 2741, last 5 seconds : 0
LSAs flooded high-prio : 10, last 5 seconds : 0
LSAs retransmitted : 0, last 5 seconds : 0
LSAs transmitted to nbr: 2, last 5 seconds : 0
LSAs requested : 1, last 5 seconds : 0
LSAs acknowledged : 1831, last 5 seconds : 0

Flood queue depth : 0
Total rexmit entries : 0
db summaries : 0
lsreq entries : 0

Receive errors:

```



```

None

logical-system: A

Packet type Total Last 5 seconds
 Sent Received Sent Received
Hello 313698 313695 0 0
 DbD 2 3 0 0
 LSReq 1 1 0 0
LSUpdate 1825 2752 0 0
LSAck 2747 1821 0 0

DBDs retransmitted : 0, last 5 seconds : 0
LSAs flooded : 1825, last 5 seconds : 0
LSAs flooded high-prio : 10, last 5 seconds : 0
LSAs retransmitted : 0, last 5 seconds : 0
LSAs transmitted to nbr: 1, last 5 seconds : 0
LSAs requested : 2, last 5 seconds : 0
LSAs acknowledged : 2748, last 5 seconds : 0

Flood queue depth : 0
Total rexmit entries : 0
db summaries : 0
lsreq entries : 0

Receive errors:
None

```

### show ospf3 statistics

```

user@host> show ospf3 statistics

Packet type Total Last 5 seconds
 Sent Received Sent Received
Hello 0 0 0 0
 DbD 0 0 0 0
 LSReq 0 0 0 0
LSUpdate 0 0 0 0
LSAck 0 0 0 0

DBDs retransmitted : 0, last 5 seconds : 0
LSAs flooded : 0, last 5 seconds : 0
LSAs flooded high-prio : 0, last 5 seconds : 0
LSAs retransmitted : 0, last 5 seconds : 0
LSAs transmitted to nbr: 0, last 5 seconds : 0
LSAs requested : 0, last 5 seconds : 0
LSAs acknowledged : 0, last 5 seconds : 0

Flood queue depth : 0
Total rexmit entries : 0
db summaries : 0
lsreq entries : 0

Receive errors:
None

```



## CHAPTER 25

# Protocol-Independent Routing Operational Commands

- `show as-path`
- `show as-path domain`
- `show as-path summary`
- `show route`
- `show route active-path`
- `show route advertising-protocol`
- `show route all`
- `show route aspath-regex`
- `show route best`
- `show route brief`
- `show route ccc`
- `show route community`
- `show route community-name`
- `show route damping`
- `show route detail`
- `show route exact`
- `show route export`
- `show route export vrf-target`
- `show route extensive`
- `show route flow validation`
- `show route forwarding-table`
- `show route forwarding-table interface-name`
- `show route hidden`
- `show route inactive-path`
- `show route inactive-prefix`
- `show route instance`

- `show route label`
- `show route label-switched-path`
- `show route localization`
- `show route martians`
- `show route match-prefix`
- `show route next-hop`
- `show route no-community`
- `show route output`
- `show route protocol`
- `show route range`
- `show route receive-protocol`
- `show route resolution`
- `show route snooping`
- `show route source-gateway`
- `show route summary`
- `show route table`
- `show route terse`

## show as-path

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1843</a><br><a href="#">Syntax (EX Series Switches) on page 1843</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                      | <pre>show as-path &lt;brief   detail&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches)</b> | <pre>show as-path &lt;brief   detail&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>                 | <p>Display the distribution of autonomous system (AS) paths that the local routing device is using (usually through the routing table). Use this command to debug problems for AS paths and to understand how AS paths have been manipulated through a policy (through the <b>as-path-prepend</b> action) or through aggregation.</p> <p>AS paths are stored in a hash table. A hash table is one method for fast lookup. Each entry in the table is called a bucket. Junos OS computes a hash value that indicates in which bucket the AS path is stored. The AS paths are dispersed among the hash buckets so that a manageable number of AS paths is stored in each bucket. Only unique AS paths are stored. Duplicate AS paths increase a reference count, but do not increase the number of AS paths stored in the hash table.</p> |
| <b>Options</b>                     | <p><b>none</b>—Display basic information about AS paths that the local routing device is using (same as brief).</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li>• <a href="#">show as-path summary on page 1850</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>       | <a href="#">show as-path on page 1844</a><br><a href="#">show as-path detail on page 1845</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>               | <p><a href="#">Table 177 on page 1844</a> lists the output fields for the <b>show as-path</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 177: show as-path Output Fields

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Total AS paths</b> | Total number of AS paths.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>brief</b> none |
| <b>Bucket</b>         | Bucket number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels        |
| <b>Count</b>          | Number of AS path entries in this bucket.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels        |
| <b>AS path</b>        | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> <li>• <b>Atomic</b>—Route is an aggregate of several route prefixes.</li> <li>• <b>Aggregat</b>—Routing device has summarized a range of prefixes.</li> </ul> | All levels        |
| <b>domain</b>         | Number of independent AS domains. The AS paths of an independent AS domain are not shared with the AS paths and AS path attributes of other domains, including the master routing instance domain.                                                                                                                                                                                                                                                                                                                                            | <b>detail</b>     |
| <b>neighbor as</b>    | AS peer address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail</b>     |
| <b>length</b>         | Length of the AS path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail</b>     |
| <b>segments</b>       | Length of the AS segment descriptor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail</b>     |
| <b>references</b>     | Path reference count.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail</b>     |

## Sample Output

### show as-path

```

user@host> show as-path
Total AS paths: 30382
 Bucket 0 Count: 36
 I
 14203 2914 174 31752 I
 14203 2914 701 21512 I
 14203 2914 1239 26632 I
 14203 2914 1239 29704 I
 14203 2914 4323 10248 I
 14203 2914 4766 23560 I
 14203 2914 6395 32776 I
 14203 2914 7911 11272 I
 14203 2914 12180 18440 I
 14203 2914 17408 17416 I
 14203 2914 701 702 24586 I
 14203 2914 1239 4657 9226 I
 14203 2914 1239 7132 16394 I
 14203 2914 1299 8308 34826 I
 14203 2914 3320 5603 28682 I

```

```

14203 2914 3491 1680 33802 I
14203 2914 3549 7908 27658 I
14203 2914 3549 20804 30730 I
14203 2914 7018 2687 9226 I
14203 2914 174 9318 9318 23564 I
14203 2914 701 3786 3786 23564 I
14203 2914 701 4761 4795 9228 I
14203 2914 1239 7132 5673 18444 I
14203 2914 3491 20485 24588 24588 I
14203 2914 5511 2200 1945 2060 I
14203 2914 7911 14325 14325 14348 I
14203 2914 701 4637 9230 9230 9230 I
14203 2914 6395 14 14 14 14 I
14203 2914 9299 6163 6163 6163 9232 I
14203 2914 3356 3356 3356 3356 11955 21522 I
14203 2914 9837 9837 9219 I Aggregator: 9219 202.27.91.253
14203 2914 174 30209 30222 30222 30222 ?
14203 2914 1299 5377 I (Atomic) Aggregator: 5377 193.219.192.22
14203 2914 4323 36097 I (Atomic) Aggregator: 36097 216.69.252.254
14203 2914 209 2516 17676 23813 I (Atomic) Aggregator: 23813 219.127.233.66
Bucket 1 Count: 28
14203 2914 35847 I
14203 2914 174 19465 I
14203 2914 174 35849 I
14203 2914 2828 32777 I
14203 2914 4323 14345 I
14203 2914 4323 29705 I
14203 2914 6395 32777 I

```

...

### show as-path detail

```

user@host> show as-path detail
Total AS paths: 30410
Bucket 0 Count: 36
AS path: I
 domain 0, length 0, segments 0, references 54
AS path: 14203 2914 174 31752 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 701 21512 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 1239 26632 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 1239 29704 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 4323 10248 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 4766 23560 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 6395 32776 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 3
AS path: 14203 2914 7911 11272 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 2
AS path: 14203 2914 12180 18440 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 3
AS path: 14203 2914 17408 17416 I
 domain 1, neighbor as: 14203, length 4, segments 1, references 3
AS path: 14203 2914 701 702 24586 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 3
AS path: 14203 2914 1239 4657 9226 I

```

```
 domain 1, neighbor as: 14203, length 5, segments 1, references 7
AS path: 14203 2914 1239 7132 16394 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 1299 8308 34826 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 3320 5603 28682 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 3491 1680 33802 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 3549 7908 27658 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 3549 20804 30730 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 2
AS path: 14203 2914 7018 2687 9226 I
 domain 1, neighbor as: 14203, length 5, segments 1, references 3
AS path: 14203 2914 174 9318 9318 23564 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 2
AS path: 14203 2914 701 3786 3786 23564 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 2
AS path: 14203 2914 701 4761 4795 9228 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 14
AS path: 14203 2914 1239 7132 5673 18444 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 2
AS path: 14203 2914 3491 20485 24588 24588 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 4
AS path: 14203 2914 5511 2200 1945 2060 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 2
AS path: 14203 2914 7911 14325 14325 14348 I
 domain 1, neighbor as: 14203, length 6, segments 1, references 2
AS path: 14203 2914 701 4637 9230 9230 9230 I
 domain 1, neighbor as: 14203, length 7, segments 1, references 3
AS path: 14203 2914 6395 14 14 14 14 I
 domain 1, neighbor as: 14203, length 7, segments 1, references 10
...

```



## show as-path domain

|                                    |                                                                                                                                                                                                                                                    |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1847</a><br><a href="#">Syntax (EX Series Switches) on page 1847</a>                                                                                                                                                    |
| <b>Syntax</b>                      | show as-path domain<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                        |
| <b>Syntax (EX Series Switches)</b> | show as-path domain                                                                                                                                                                                                                                |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                              |
| <b>Description</b>                 | Display autonomous system (AS) path domain information.                                                                                                                                                                                            |
| <b>Options</b>                     | <b>none</b> —(Optional) Display AS path domain information for all routing instances.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>       | <a href="#">show as-path domain on page 1849</a>                                                                                                                                                                                                   |
| <b>Output Fields</b>               | <a href="#">Table 178 on page 1847</a> lists the output fields for the <b>show as-path domain</b> command. Output fields are listed in the approximate order in which they appear                                                                  |

**Table 178: show as-path domain Output Fields**

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                               |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Domain</b>       | Number of independent AS domains. The AS paths of an independent AS domain are not shared with the AS paths and AS path attributes of other domains, including the master routing instance domain.                                                                                                                                              |
| <b>Primary</b>      | Primary AS number.                                                                                                                                                                                                                                                                                                                              |
| <b>References</b>   | Path reference count.                                                                                                                                                                                                                                                                                                                           |
| <b>Number Paths</b> | Number of known AS paths.                                                                                                                                                                                                                                                                                                                       |
| <b>Flags</b>        | Information about the AS path: <ul style="list-style-type: none"> <li>• <b>ASLoop</b>—Path contains an AS loop.</li> <li>• <b>Atomic</b>—Path includes the ATOMIC_AGGREGATE path attribute.</li> <li>• <b>Local</b>—Path was created by local aggregation.</li> <li>• <b>Master</b>—Path was created by the master routing instance.</li> </ul> |
| <b>Local AS</b>     | AS number of the local routing device.                                                                                                                                                                                                                                                                                                          |

Table 178: show as-path domain Output Fields (*continued*)

| Field Name   | Field Description                                       |
|--------------|---------------------------------------------------------|
| <b>Loops</b> | How many times this AS number can appear in an AS path. |

---

## Sample Output

show as-path domain

```
user@host> show as-path domain
Domain: 1 Primary: 10458
References: 3 Paths: 30383
Flags: Master
Local AS: 10458 Loops: 1
```

## show as-path summary

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1850</a><br><a href="#">Syntax (EX Series Switches) on page 1850</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                      | <pre>show as-path summary &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switches)</b> | show as-path summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>                 | <p>Display autonomous system (AS) path summary information.</p> <p>AS paths are stored in a hash table. A hash table is one method for fast lookup. Each entry in the table is called a bucket. Junos OS computes a hash value that indicates in which bucket the AS path is stored. The AS paths are dispersed among the hash buckets so that a manageable number of AS paths is stored in each bucket. Only unique AS paths are stored. Duplicate AS paths increase a reference count, but do not increase the number of AS paths stored in the hash table.</p> |
| <b>Options</b>                     | <p><b>none</b>—(Optional) Display AS path summary information for all routing instances.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li><a href="#">show as-path on page 1843</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>       | <a href="#">show as-path summary on page 1851</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>               | <p><a href="#">Table 179 on page 1850</a> lists the output fields for the <b>show as-path summary</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                        |

**Table 179: show as-path summary Output Fields**

| Field Name      | Field Description                             |
|-----------------|-----------------------------------------------|
| <b>AS Paths</b> | Number of AS paths.                           |
| <b>Buckets</b>  | Number of hash buckets in use.                |
| <b>Max</b>      | Maximum number of AS path entries per bucket. |
| <b>Min</b>      | Minimum number of AS path entries per bucket. |
| <b>Avg</b>      | Average number of AS path entries per bucket. |

Table 179: show as-path summary Output Fields (*continued*)

| Field Name    | Field Description                                 |
|---------------|---------------------------------------------------|
| Std deviation | Standard deviation of AS path entries per bucket. |

## Sample Output

show as-path summary

```
user@host> show as-path summary
AS Paths Buckets Max Min Avg Std deviation
30425 1024 95 12 29 6.481419
```

## show route

---

**List of Syntax**    [Syntax on page 1852](#)  
                          [Syntax \(EX Series Switches\) on page 1852](#)

**Syntax**    show route  
              <all>  
              <*destination-prefix*>  
              <logical-system (all | *logical-system-name*)>  
              <private>

**Syntax (EX Series Switches)**    show route  
                                          <all>  
                                          <*destination-prefix*>  
                                          <private>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              Option **private** introduced in Junos OS Release 9.5.  
                              Option **private** introduced in Junos OS Release 9.5 for EX Series switches.  
                              Command introduced in Junos OS Release 15.1R3 on MX Series routers for enhanced subscriber management.

**Description**    Display the active entries in the routing tables.

**Options**    **none**—Display brief information about all active entries in the routing tables.

**all**—(Optional) Display information about all routing tables, including private, or internal, routing tables.

***destination-prefix***—(Optional) Display active entries for the specified address or range of addresses.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**private**—(Optional) Display information only about all private, or internal, routing tables.

**Required Privilege Level**    view

**Related Documentation**

- *Example: Configuring RIP*
- *Example: Configuring RIPng*
- *Example: Configuring IS-IS*
- *Examples: Configuring Internal BGP Peering*
- *Examples: Configuring External BGP Peering*
- *Examples: Configuring OSPF Routing Policy*
- *Verifying and Managing Junos OS Enhanced Subscriber Management*

**List of Sample Output** [show route on page 1855](#)  
[show route on page 1856](#)  
[show route \(with Destination Prefix\) on page 1856](#)  
[show route destination-prefix detail on page 1856](#)  
[show route extensive on page 1857](#)  
[show route \(Enhanced Subscriber Management\) on page 1857](#)

**Output Fields** [Table 180 on page 1853](#) describes the output fields for the **show route** command. Output fields are listed in the approximate order in which they appear.

**Table 180: show route Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>number routes</i>       | <p>Number of routes in the routing table and total number of routes in the following states:</p> <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active).</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive). A holddown route was once the active route and is no longer the active route. The route is in the holddown state because a protocol still has interest in the route, meaning that the interest bit is set. A protocol might have its interest bit set on the previously active route because the protocol is still advertising the route. The route will be deleted after all protocols withdraw their advertisement of the route and remove their interest bit. A persistent holddown state often means that the interested protocol is not releasing its interest bit properly.</li> </ul> <p>However, if you have configured advertisement of multiple routes (with the <b>add-path</b> or <b>advertise-inactive</b> statement), the holddown bit is most likely set because BGP is advertising the route as an active route. In this case, you can ignore the holddown state because nothing is wrong.</p> <ul style="list-style-type: none"> <li>• <b>hidden</b> (routes that are not used because of a routing policy).</li> </ul> |
| <i>destination-prefix</i>  | <p>Route destination (for example:10.0.0.1/24). Sometimes the route information is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only. For example, 10.1.1.195:NoCtrlWord:1:1:Local/96): <ul style="list-style-type: none"> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> </li> </ul>                                                                                                                                                                      |

Table 180: show route Output Fields (*continued*)

| Field Name                                        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [ <i>protocol, preference</i> ]                   | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• +—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• - —A hyphen indicates the last active route.</li> <li>• *—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                                   |
| <i>weeks:days</i><br><i>hours:minutes:seconds</i> | How long the route been known (for example, <b>2w4d 13:11:14</b> , or 2 weeks, 4 days, 13 hours, 11 minutes, and 14 seconds).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| metric                                            | Cost value of the indicated route. For routes within an AS, the cost is determined by the IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| localpref                                         | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| from                                              | Interface from which the route was received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| AS path                                           | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• I—IGP.</li> <li>• E—EGP.</li> <li>• ?—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• [ ]—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device, or if AS path prepending is configured.</li> <li>• { }—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• ( )—Parentheses enclose a confederation.</li> <li>• ( [ ] )—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |



Table 180: show route Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>validation-state</b> | <p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>—Indicates that the prefix is found, but either the corresponding AS received from the EBGP peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>Unknown</b>—Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>Unverified</b>—Indicates that the origin of the prefix is not verified against the database. This is because the database got populated and the validation is not called for in the BGP import policy, although origin validation is enabled, or the origin validation is not enabled for the BGP peers.</li> <li>• <b>Valid</b>—Indicates that the prefix and autonomous system pair are found in the database.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>to</b>               | <p>Next hop to the destination. An angle bracket (&gt;) indicates that the route is the selected route.</p> <p>If the destination is <b>Discard</b>, traffic is dropped.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>via</b>              | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> <li>• <b>lsp-path-name</b>—Name of the LSP used to reach the next hop.</li> <li>• <b>label-action</b>—MPLS label and operation occurring at the next hop. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label). For VPNs, expect to see multiple <b>push</b> operations, corresponding to the inner and outer labels required for VPN routes (in the case of a direct PE-to-PE connection, the VPN route would have the inner label push only).</li> </ul> |
| <b>Private unicast</b>  | <p>(Enhanced subscriber management for MX Series routers) Indicates that an access-internal route is managed by enhanced subscriber management. By contrast, access-internal routes <i>not</i> managed by enhanced subscriber management are displayed with associated next-hop and media access control (MAC) address information.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### show route

```

user@host> show route
inet.0: 11 destinations, 12 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1:65500:1:10.0.0.20/240
 * [MVPN/70] 19:53:41, metric2 1
 Indirect
1:65500:1:10.0.0.40/240
 * [BGP/170] 19:53:29, localpref 100, from 10.0.0.30
 AS path: I
 > to 10.0.24.4 via 1t-0/3/0.24, label-switched-path toD

```

```

[BGP/170] 19:53:26, localpref 100, from 10.0.0.33
AS path: I
> to 10.0.24.4 via lt-0/3/0.24, label-switched-path toD
1:65500:1:10.0.0.60/240
*[BGP/170] 19:53:29, localpref 100, from 10.0.0.30
AS path: I
> to 10.0.28.8 via lt-0/3/0.28, label-switched-path toF
[BGP/170] 19:53:25, localpref 100, from 10.0.0.33
AS path: I
> to 10.0.28.8 via lt-0/3/0.28, label-switched-path toF

```

### show route

The following sample output shows a VPN route with composite next hops enabled. The first **Push** operation corresponds to the outer label. The second **Push** operation corresponds to the inner label.

```

user@host> show route 70.0.0.0

13979:665001.inet.0: 871 destinations, 3556 routes (871 active, 0 holddown, 0
hidden)
+ = Active Route, - = Last Active, * = Both

70.0.0.0/24 @[BGP/170] 00:28:32, localpref 100, from 10.9.9.160
 AS path: 13980 ?, validation-state: unverified
 > to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)
 [BGP/170] 00:28:28, localpref 100, from 10.9.9.169
 AS path: 13980 ?, validation-state: unverified
 > to 10.100.0.42 via ae2.0, Push 126016, Push 300368(top)
 #[Multipath/255] 00:28:28, metric2 102
 > to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)
 to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)

```

### show route (with Destination Prefix)

```

user@host> show route 172.16.0.0/12

inet.0: 10 destinations, 10 routes (9 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

172.16.0.0/12 *[Static/5] 2w4d 12:54:27
 > to 192.168.167.254 via fxp0.0

```

### show route destination-prefix detail

```

user@host> show route 5.5.5.0 detail

inet.0: 15 destinations, 20 routes (15 active, 0 holddown, 0 hidden)
5.5.5.0/24 (2 entries, 2 announced)
 *BGP Preference: 170/-101
 ...
 BGP-Static Preference: 4294967292
 Next hop type: Discard
 Address: 0x9041ae4
 Next-hop reference count: 2
 State: <NoReadvrt Int Ext AlwaysFlash>
 Inactive reason: Route Preference
 Local AS: 200
 Age: 4d 1:40:40
 Validation State: unverified
 Task: RT

```

```
Announcement bits (1): 2-BGP_RT_Background
AS path: 4 5 6 I
```

### show route extensive

```
user@host> show route extensive
v1.mvpn.0: 5 destinations, 8 routes (5 active, 1 holddown, 0 hidden)
1:65500:1:10.0.0.40/240 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 PMSI: Flags 0x0: Label[0:0:0]: PIM-SM: Sender 10.0.0.40 Group 225.1.1.1

 Next hop type: Indirect
 Address: 0x92455b8
 Next-hop reference count: 2
 Source: 10.0.0.30
 Protocol next hop: 10.0.0.40
 Indirect next hop: 2 no-forward
 State: <Active Int Ext>
 Local AS: 65500 Peer AS: 65500
 Age: 3 Metric2: 1
 Validation State: unverified
 Task: BGP_65500.10.0.0.30+179
 Announcement bits (2): 0-PIM.v1 1-mvpn global task
 AS path: I (Originator) Cluster list: 10.0.0.30
 AS path: Originator ID: 10.0.0.40
 Communities: target:65520:100
 Import Accepted
 Localpref: 100
 Router ID: 10.0.0.30
 Primary Routing Table bgp.mvpn.0
 Indirect next hops: 1
 Protocol next hop: 10.0.0.40 Metric: 1
 Indirect next hop: 2 no-forward
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.0.24.4 via lt-0/3/0.24 weight 0x1
 10.0.0.40/32 Originating RIB: inet.3
 Metric: 1 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: 10.0.24.4 via lt-0/3/0.24
```

### show route (Enhanced Subscriber Management)

```
user@host> show route
inet.0: 41 destinations, 41 routes (40 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

100.20.0.111/32 *[Access-internal/12] 00:00:08
 > to #0 10.0.0.1.93.65 via demux0.1073741824
100.20.0.112/32 *[Access-internal/12] 00:00:08
 Private unicast
.
.
.
```

## show route active-path

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1858</a><br><a href="#">Syntax (EX Series Switches) on page 1858</a>                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                      | <code>show route active-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switches)</b> | <code>show route active-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>         | Command introduced in Junos OS Release 8.0.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                               |
| <b>Description</b>                 | Display all active routes for destinations. An active route is a route that is selected as the best path. Inactive routes are not displayed.                                                                                                                                                                                                                                    |
| <b>Options</b>                     | <b>none</b> —Display all active routes.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>       | <a href="#">show route active-path on page 1858</a><br><a href="#">show route active-path brief on page 1859</a><br><a href="#">show route active-path detail on page 1859</a><br><a href="#">show route active-path extensive on page 1860</a><br><a href="#">show route active-path terse on page 1862</a>                                                                    |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                  |

## Sample Output

### show route active-path

```
user@host> show route active-path

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.70.19/32 *[Direct/0] 21:33:52
 > via lo0.0
10.255.71.50/32 *[IS-IS/15] 00:18:13, metric 10
 > to 100.1.2.1 via so-2/1/3.0
100.1.2.0/24 *[Direct/0] 00:18:36
 > via so-2/1/3.0
```

```

100.1.2.2/32 *[Local/0] 00:18:41
 Local via so-2/1/3.0
192.168.64.0/21 *[Direct/0] 21:33:52
 > via fxp0.0
192.168.70.19/32 *[Local/0] 21:33:52
 Local via fxp0.0

```

### show route active-path brief

The output for the **show route active-path brief** command is identical to that for the **show route active-path** command. For sample output, see [show route active-path on page 1858](#).

### show route active-path detail

```

user@host> show route active-path detail

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)

10.255.70.19/32 (1 entry, 1 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 3
 Next hop: via lo0.0, selected
 State: <Active Int>
 Local AS: 200
 Age: 21:37:10
 Task: IF
 Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3
 AS path: I

10.255.71.50/32 (1 entry, 1 announced)
 *IS-IS Preference: 15
 Level: 1
 Next hop type: Router, Next hop index: 397
 Next-hop reference count: 4
 Next hop: 100.1.2.1 via so-2/1/3.0, selected
 State: <Active Int>
 Local AS: 200
 Age: 21:31 Metric: 10
 Task: IS-IS
 Announcement bits (4): 0-KRT 2-IS-IS 5-Resolve tree 2 6-Resolve
tree 3
 AS path: I

100.1.2.0/24 (1 entry, 1 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 3
 Next hop: via so-2/1/3.0, selected
 State: <Active Int>
 Local AS: 200
 Age: 21:54
 Task: IF
 Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3
 AS path: I

100.1.2.2/32 (1 entry, 1 announced)
 *Local Preference: 0
 Next hop type: Local

```

```

Next-hop reference count: 11
Interface: so-2/1/3.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 21:59
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.64.0/21 (1 entry, 1 announced)
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via fxp0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:37:10
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.70.19/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: fxp0.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 21:37:10
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

```

### show route active-path extensive

```

user@host> show route active-path extensive

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
10.255.70.19/32 (1 entry, 1 announced)
TSI:
IS-IS level 1, LSP fragment 0
IS-IS level 2, LSP fragment 0
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via lo0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3

AS path: I

10.255.71.50/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.255.71.50/32 -> {100.1.2.1}
IS-IS level 2, LSP fragment 0
*IS-IS Preference: 15
Level: 1
Next hop type: Router, Next hop index: 397

```

```

Next-hop reference count: 4
Next hop: 100.1.2.1 via so-2/1/3.0, selected
State: <Active Int>
Local AS: 200
Age: 24:08 Metric: 10
Task: IS-IS
Announcement bits (4): 0-KRT 2-IS-IS 5-Resolve tree 2 6-Resolve
tree 3
AS path: I

100.1.2.0/24 (1 entry, 1 announced)
TSI:
IS-IS level 1, LSP fragment 0
IS-IS level 2, LSP fragment 0
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via so-2/1/3.0, selected
State: <Active Int>
Local AS: 200
Age: 24:31
Task: IF
Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3
AS path: I

100.1.2.2/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: so-2/1/3.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 24:36
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.64.0/21 (1 entry, 1 announced)
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via fxp0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.70.19/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: fxp0.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3

```

AS path: I

### show route active-path terse

```
user@host> show route active-path terse
```

```
inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

| A | Destination      | P | Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|---|------------------|---|-----|----------|----------|-------------|---------|
| * | 10.255.70.19/32  | D | 0   |          |          | >lo0.0      |         |
| * | 10.255.71.50/32  | I | 15  | 10       |          | >100.1.2.1  |         |
| * | 100.1.2.0/24     | D | 0   |          |          | >so-2/1/3.0 |         |
| * | 100.1.2.2/32     | L | 0   |          |          | Local       |         |
| * | 192.168.64.0/21  | D | 0   |          |          | >fxp0.0     |         |
| * | 192.168.70.19/32 | L | 0   |          |          | Local       |         |



## show route advertising-protocol

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Syntax</b>                   | <code>show route advertising-protocol <i>protocol</i> <i>neighbor-address</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| <b>Description</b>              | Display the routing information as it has been prepared for advertisement to a particular neighbor of a particular dynamic routing protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>Options</b>                  | <p><b><i>protocol</i></b>—Protocol transmitting the route:</p> <ul style="list-style-type: none"> <li>• <b>bgp</b>—Border Gateway Protocol</li> <li>• <b>dvmrp</b>—Distance Vector Multicast Routing Protocol</li> <li>• <b>msdp</b>—Multicast Source Discovery Protocol</li> <li>• <b>pim</b>—Protocol Independent Multicast</li> <li>• <b>rip</b>—Routing Information Protocol</li> <li>• <b>ripng</b>—Routing Information Protocol next generation</li> </ul> <p><b><i>neighbor-address</i></b>—Address of the neighboring router to which the route entry is being transmitted.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |  |
| <b>Additional Information</b>   | Routes displayed are routes that the routing table has exported into the routing protocol and that have been filtered by the associated protocol's <b>export</b> routing policy statements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>List of Sample Output</b>    | <a href="#">show route advertising-protocol bgp (Layer 3 VPN) on page 1865</a><br><a href="#">show route advertising-protocol bgp detail on page 1866</a><br><a href="#">show route advertising-protocol bgp detail (Layer 2 VPN) on page 1866</a><br><a href="#">show route advertising-protocol bgp detail (Layer 3 VPN) on page 1866</a><br><a href="#">show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address) on page 1866</a>                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Output Fields</b>            | Table 181 on page 1863 lists the output fields for the <b>show route advertising-protocol</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |

Table 181: show route advertising-protocol Output Fields

| Field Name                | Field Description                                      | Level of Output |
|---------------------------|--------------------------------------------------------|-----------------|
| <i>routing-table-name</i> | Name of the routing table—for example, <b>inet.0</b> . | All levels      |

Table 181: show route advertising-protocol Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>number destinations</b>                   | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                             | All levels              |
| <b>number routes</b>                         | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active)</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li>• <b>hidden</b> (the routes are not used because of a routing policy)</li> </ul>                                                                | All levels              |
| <b>Prefix</b>                                | Destination prefix.                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>brief none</b>       |
| <b>destination-prefix (entry, announced)</b> | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>BGP group and type</b>                    | BGP group name and type ( <b>Internal</b> or <b>External</b> ).                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>Route Distinguisher</b>                   | Unique 64-bit prefix augmenting each IP subnet.                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>Advertised Label</b>                      | Incoming label advertised by the Label Distribution Protocol (LDP). When an IP packet enters a label-switched path (LSP), the ingress router examines the packet and assigns it a label based on its destination, placing the label in the packet's header. The label transforms the packet from one that is forwarded based on its IP routing information to one that is forwarded based on information associated with the label. | <b>detail extensive</b> |
| <b>Label-Base, range</b>                     | First label in a block of labels and label block size. A remote PE router uses this first label when sending traffic toward the advertising PE router.                                                                                                                                                                                                                                                                              | <b>detail extensive</b> |
| <b>VPN Label</b>                             | Virtual private network (VPN) label. Packets are sent between CE and PE routers by advertising VPN labels. VPN labels transit over either a Resource Reservation Protocol (RSVP) or a Label Distribution Protocol (LDP) label-switched path (LSP) tunnel.                                                                                                                                                                           | <b>detail extensive</b> |
| <b>Nexthop</b>                               | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.<br><br>If the next-hop advertisement to the peer is <b>Self</b> , and the RIB-out next hop is a specific IP address, the RIB-out IP address is included in the extensive output. See <a href="#">show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address)</a> on page 1866.                      | All levels              |
| <b>MED</b>                                   | Multiple exit discriminator value included in the route.                                                                                                                                                                                                                                                                                                                                                                            | <b>brief</b>            |
| <b>Lclpref or Localpref</b>                  | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                       | All levels              |

Table 181: show route advertising-protocol Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output         |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>AS path</b>             | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the local AS number associated with the AS path if configured on the router, or if AS path prepending is configured.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels              |
| <b>Communities</b>         | Community path attribute for the route. see the output field table for the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>AIGP</b>                | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>Attrset AS</b>          | Number, local preference, and path of the autonomous system (AS) that originated the route. These values are stored in the <b>Attrset</b> attribute at the originating router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |
| <b>Layer2-info: encaps</b> | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |
| <b>control flags</b>       | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>mtu</b>                 | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |

## Sample Output

### show route advertising-protocol bgp (Layer 3 VPN)

```

user@host> show route advertising-protocol bgp 10.255.14.171
VPN-A.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.14.172/32 Self 1 100 I
VPN-B.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.14.181/32 Self 2 100 I

```

### show route advertising-protocol bgp detail

```
user@host> show route advertising-protocol bgp 111.222.1.3 detail
bgp20.inet.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
111.222.1.11/32 (1 entry, 1 announced)
 BGP group pe-pe type Internal
 Route Distinguisher: 111.255.14.11:69
 Advertised Label: 100000
 next hop: Self
 Localpref: 100
 AS path: 2 I
 Communities: target:69:20
 AIGP 210
111.8.0.0/16 (1 entry, 1 announced)
 BGP group pe-pe type Internal
 Route Distinguisher: 111.255.14.11:69
 Advertised Label: 100000
 Next hop: Self
 Localpref: 100
 AS path: 2 I
 Communities: target:69:20
 AIGP 210
```

### show route advertising-protocol bgp detail (Layer 2 VPN)

```
user@host> show route advertising-protocol bgp 192.168.24.1 detail
vpn-a.12vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
192.168.16.1:1:1:1/96 (1 entry, 1 announced)
 BGP group int type Internal
 Route Distinguisher: 192.168.16.1:1
 Label-base : 32768, range : 3
 Nexthop: Self
 Localpref: 100
 AS path: I
 Communities: target:65412:100
 AIGP 210
 Layer2-info: encaps:VLAN, control flags:, mtu:
```

### show route advertising-protocol bgp detail (Layer 3 VPN)

```
user@host> show route advertising-protocol bgp 10.255.14.176 detail
vpna.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
* 10.49.0.0/30 (1 entry, 1 announced)
 BGP group ibgp type Internal
 Route Distinguisher: 10.255.14.174:2
 VPN Label: 101264
 Nexthop: Self
 Localpref: 100
 AS path: I
 Communities: target:200:100
 AIGP 210
 AttrSet AS: 100
 Localpref: 100
 AS path: I
 ...
```

### show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address)

```
user@host> show route advertising-protocol bgp 200.0.0.2 170.0.1.0/24 extensive all
inet.0: 13 destinations, 19 routes (13 active, 0 holddown, 6 hidden)
 170.0.1.0/24 (2 entries, 1 announced)
```

```
BGP group eBGP-INTEROP type External
 Nexthop: Self (rib-out 10.100.3.2)
 AS path: [4713] 200 I
...
```

## show route all

---

|                                    |                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1868</a><br><a href="#">Syntax (EX Series Switches) on page 1868</a>                                                                                                                                                                                                                                               |
| <b>Syntax</b>                      | show route all<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switches)</b> | show route all                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                         |
| <b>Description</b>                 | Display information about all routes in all routing tables, including private, or internal, tables.                                                                                                                                                                                                                                           |
| <b>Options</b>                     | <b>none</b> —Display information about all routes in all routing tables, including private, or internal, tables.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                 |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>       | <a href="#">show route all on page 1868</a>                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>               | In Junos OS Release 9.5 and later, only the output fields for the <b>show route all</b> command display all routing tables, including private, or hidden, routing tables. The output field table of the <a href="#">show route</a> command does not display entries for private, or hidden, routing tables in Junos OS Release 9.5 and later. |

## Sample Output

### show route all

The following example displays a snippet of output from the **show route** command and then displays the same snippet of output from the **show route all** command:

```
user@host> show route
mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
0 *[MPLS/0] 2d 02:24:39, metric 1
 Receive
1 *[MPLS/0] 2d 02:24:39, metric 1
 Receive
2 *[MPLS/0] 2d 02:24:39, metric 1
 Receive
800017 *[VPLS/7] 1d 14:00:16
 > via vt-3/2/0.32769, Pop
800018 *[VPLS/7] 1d 14:00:26
 > via vt-3/2/0.32772, Pop
```

```
user@host> show route all
mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
0 *[MPLS/0] 2d 02:19:12, metric 1
 Receive
1 *[MPLS/0] 2d 02:19:12, metric 1
 Receive
2 *[MPLS/0] 2d 02:19:12, metric 1
 Receive
800017 *[VPLS/7] 1d 13:54:49
 > via vt-3/2/0.32769, Pop
800018 *[VPLS/7] 1d 13:54:59
 > via vt-3/2/0.32772, Pop
vt-3/2/0.32769 [VPLS/7] 1d 13:54:49
 Unusable
vt-3/2/0.32772 [VPLS/7] 1d 13:54:59
 Unusable
```

## show route aspath-regex

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1870</a><br><a href="#">Syntax (EX Series Switches) on page 1870</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                      | <code>show route aspath-regex <i>regular-expression</i></code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switches)</b> | <code>show route aspath-regex <i>regular-expression</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                 | Display the entries in the routing table that match the specified autonomous system (AS) path regular expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                     | <b><i>regular-expression</i></b> —Regular expression that matches an entire AS path.<br><br><b><i>logical-system (all   <i>logical-system-name</i>)</i></b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Additional Information</b>      | <p>You can specify a regular expression as:</p> <ul style="list-style-type: none"><li>• An individual AS number</li><li>• A period wildcard used in place of an AS number</li><li>• An AS path regular expression that is enclosed in parentheses</li></ul> <p>You also can include the operators described in the table of AS path regular expression operators in the <i>Junos Policy Framework Configuration Guide</i>. The following list summarizes these operators:</p> <ul style="list-style-type: none"><li>• <b><i>{m,n}</i></b>—At least <i>m</i> and at most <i>n</i> repetitions of the AS path term.</li><li>• <b><i>{m}</i></b>—Exactly <i>m</i> repetitions of the AS path term.</li><li>• <b><i>{m,}</i></b>—<i>m</i> or more repetitions of the AS path term.</li><li>• <b><i>*</i></b>—Zero or more repetitions of an AS path term.</li><li>• <b><i>+</i></b>—One or more repetitions of an AS path term.</li><li>• <b><i>?</i></b>—Zero or one repetition of an AS path term.</li><li>• <b><i>aspath_term   aspath_term</i></b>—Match one of the two AS path terms.</li></ul> <p>When you specify more than one AS number or path term, or when you include an operator in the regular expression, enclose the entire regular expression in quotation marks. For example, to match any path that contains AS number 234, specify the following command:</p> <pre>show route aspath-regex ". * 234 ."</pre> |



|                                 |                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | view                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show route aspath-regex (Matching a Specific AS Number) on page 1871</a><br><a href="#">show route aspath-regex (Matching Any Path with Two AS Numbers) on page 1871</a> |
| <b>Output Fields</b>            | For information about output fields, see the output field table for the <a href="#">show route</a> command.                                                                          |

## Sample Output

### show route aspath-regex (Matching a Specific AS Number)

```

user@host> show route aspath-regex 65477
inet.0: 46411 destinations, 46411 routes (46409 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both

111.222.1.0/25 *[BGP/170] 00:08:48, localpref 100, from 111.222.2.24
 AS Path: [65477] ({65488 65535}) IGP
 to 111.222.18.225 via fpa0.0(111.222.18.233)
111.222.1.128/25 *[IS-IS/15] 09:15:37, metric 37, tag 1
 to 111.222.18.225 via fpa0.0(111.222.18.233)
 [BGP/170] 00:08:48, localpref 100, from 111.222.2.24
 AS Path: [65477] ({65488 65535}) IGP
 to 111.222.18.225 via fpa0.0(111.222.18.233)
...

```

### show route aspath-regex (Matching Any Path with Two AS Numbers)

```

user@host> show route aspath-regex ?.* 234 3561.*?

inet.0: 46351 destinations, 46351 routes (46349 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both

9.20.0.0/17 *[BGP/170] 01:35:00, localpref 100, from 131.103.20.49
 AS Path: [666] 234 3561 2685 2686 Incomplete
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
12.10.231.0/24 *[BGP/170] 01:35:00, localpref 100, from 131.103.20.49
 AS Path: [666] 234 3561 5696 7369 IGP
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
24.64.32.0/19 *[BGP/170] 01:34:59, localpref 100, from 131.103.20.49
 AS Path: [666] 234 3561 6327 IGP
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
...

```

## show route best

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax              | <a href="#">Syntax on page 1872</a><br><a href="#">Syntax (EX Series Switches) on page 1872</a>                                                                                                                                                                                                                                                                                                          |
| Syntax                      | <code>show route best <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                              |
| Syntax (EX Series Switches) | <code>show route best <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                        |
| Release Information         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                    |
| Description                 | Display the route in the routing table that is the best route to the specified address or range of addresses. The best route is the longest matching route.                                                                                                                                                                                                                                              |
| Options                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b><i>destination-prefix</i></b> —Address or range of addresses.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                                     |
| List of Sample Output       | <a href="#">show route best on page 1872</a><br><a href="#">show route best detail on page 1873</a><br><a href="#">show route best extensive on page 1874</a><br><a href="#">show route best terse on page 1874</a>                                                                                                                                                                                      |
| Output Fields               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                           |

## Sample Output

### show route best

```
user@host> show route best 10.255.70.103
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.255.70.103/32 *[OSPF/10] 1d 13:19:20, metric 2
 > to 10.31.1.6 via ge-3/1/0.0
 via so-0/3/0.0

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.255.70.103/32 *[RSVP/7] 1d 13:20:13, metric 2
```

```

> via so-0/3/0.0, label-switched-path green-r1-r3

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.0.0.0/8 * [Direct/0] 2d 01:43:34
 > via fxp2.0
 [Direct/0] 2d 01:43:34
 > via fxp1.0

```

### show route best detail

```

user@host> show route best 10.255.70.103 detail
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
10.255.70.103/32 (1 entry, 1 announced)
 *OSPF Preference: 10
 Next-hop reference count: 9
 Next hop: 10.31.1.6 via ge-3/1/0.0, selected
 Next hop: via so-0/3/0.0
 State: <Active Int>
 Local AS: 69
 Age: 1d 13:20:06 Metric: 2
 Area: 0.0.0.0
 Task: OSPF
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
10.255.70.103/32 (1 entry, 1 announced)
 State: <FlashAll>
 *RSVP Preference: 7
 Next-hop reference count: 5
 Next hop: via so-0/3/0.0 weight 0x1, selected
 Label-switched-path green-r1-r3
 Label operation: Push 100016
 State: <Active Int>
 Local AS: 69
 Age: 1d 13:20:59 Metric: 2
 Task: RSVP
 Announcement bits (1): 1-Resolve tree 2
 AS path: I

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
10.0.0.0/8 (2 entries, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via fxp2.0, selected
 State: <Active Int>
 Age: 2d 1:44:20
 Task: IF
 AS path: I
 Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via fxp1.0, selected
 State: <NotBest Int>
 Inactive reason: No difference
 Age: 2d 1:44:20

```

Task: IF  
AS path: I

### show route best extensive

The output for the **show route best extensive** command is identical to that for the **show route best detail** command. For sample output, see [show route best detail on page 1873](#).

### show route best terse

```
user@host> show route best 10.255.70.103 terse
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 10.255.70.103/32 0 10 2 >10.31.1.6
 so-0/3/0.0

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 10.255.70.103/32 R 7 2 >so-0/3/0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 10.0.0.0/8 D 0 0 >fxp2.0
 D 0 0 >fxp1.0
```

## show route brief

|                                    |                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1875</a><br><a href="#">Syntax (EX Series Switches) on page 1875</a>                                                                                                                                                                                                                                          |
| <b>Syntax</b>                      | show route brief<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | show route brief<br><destination-prefix>                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                    |
| <b>Description</b>                 | Display brief information about the active entries in the routing tables.                                                                                                                                                                                                                                                                |
| <b>Options</b>                     | <b>none</b> —Display all active entries in the routing table.<br><br><b>destination-prefix</b> —(Optional) Display active entries for the specified address or range of addresses.<br><br><b>logical-system (all   logical-system-name)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>       | <a href="#">show route brief on page 1875</a>                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>               | For information about output fields, see the Output Field table of the <a href="#">show route</a> command.                                                                                                                                                                                                                               |

## Sample Output

### show route brief

```

user@host> show route brief
inet.0: 10 destinations, 10 routes (9 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0 *[Static/5] 1w5d 20:30:29
 Discard
10.255.245.51/32 *[Direct/0] 2w4d 13:11:14
 > via lo0.0
172.16.0.0/12 *[Static/5] 2w4d 13:11:14
 > to 192.168.167.254 via fxp0.0
192.168.0.0/18 *[Static/5] 1w5d 20:30:29
 > to 192.168.167.254 via fxp0.0
192.168.40.0/22 *[Static/5] 2w4d 13:11:14
 > to 192.168.167.254 via fxp0.0
192.168.64.0/18 *[Static/5] 2w4d 13:11:14
 > to 192.168.167.254 via fxp0.0
192.168.164.0/22 *[Direct/0] 2w4d 13:11:14
 > via fxp0.0

```

```

192.168.164.51/32 *[Local/0] 2w4d 13:11:14
 Local via fxp0.0
207.17.136.192/32 *[Static/5] 2w4d 13:11:14
 > to 192.168.167.254 via fxp0.0
green.inet.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
100.101.0.0/16 *[Direct/0] 1w5d 20:30:28
 > via fe-0/0/3.0
100.101.2.3/32 *[Local/0] 1w5d 20:30:28
 Local via fe-0/0/3.0
224.0.0.5/32 *[OSPF/10] 1w5d 20:30:29, metric 1
 MultiRecv

```

## show route ccc

|                                 |                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route ccc ccc<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display circuit cross-connect (CCC) entries in the Multiprotocol Link Switching (MPLS) routing table.                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>ccc</b>—Name of an entry with a circuit cross-connect interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>show connections</i></li> </ul>                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show route ccc extensive on page 1877</a>                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>            | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                            |

## Sample Output

### show route ccc extensive

```

user@host> show route ccc fe-0/1/0.600 extensive
mpls.0: 19 destinations, 19 routes (19 active, 0 holddown, 0 hidden)
fe-0/1/2.600 (1 entry, 1 announced)
TSI:
KRT in-kernel fe-0/1/2.600.0 /16 -> {0.0.0.0}
 *CCC Preference: 7
 Next-hop reference count: 2
 Next hop: via so-0/0/3.0 weight 0x1, selected
 Label operation: Push 101424
 State: <Active Int>
 Local AS: 100
 Age: 28:13 Metric: 3
 Task: MPLS
 Announcement bits (1): 0-KRT
 AS path: I

```

## show route community

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax              | <a href="#">Syntax on page 1878</a><br><a href="#">Syntax (EX Series Switches) on page 1878</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Syntax                      | <code>show route community <i>as-number:community-value</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                        |
| Syntax (EX Series Switches) | <code>show route community <i>as-number:community-value</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Release Information         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Description                 | Display the route entries in each routing table that are members of a Border Gateway Protocol (BGP) community.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Options                     | <p><b><i>as-number:community-value</i></b>—One or more community identifiers. <b><i>as-number</i></b> is the AS number, and <b><i>community-value</i></b> is the community identifier. When you specify more than one community identifier, enclose the identifiers in double quotation marks. Community identifiers can include wildcards.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| Additional Information      | Specifying the community option displays all routes matching the community found within the routing table. The community option does not limit the output to only the routes being advertised to the neighbor after any egress routing policy.                                                                                                                                                                                                                                                                                                                                                                 |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Related Documentation       | <ul style="list-style-type: none"><li>• <a href="#">show route detail on page 1887</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| List of Sample Output       | <a href="#">show route community on page 1878</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Output Fields               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### show route community

```
user@host> show route community 234:80
inet.0: 46511 destinations, 46511 routes (46509 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both
```



```
4.0.0.0/8 *[BGP/170] 03:33:07, localpref 100, from 131.103.20.49
 AS Path: {666} 234 2548 1 IGP
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
6.0.0.0/8 *[BGP/170] 03:33:07, localpref 100, from 131.103.20.49
 AS Path: {666} 234 2548 568 721 Incomplete
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
9.2.0.0/16 *[BGP/170] 03:33:06, localpref 100, from 131.103.20.49
 AS Path: {666} 234 2548 1673 1675 1747 IGP
 to 192.156.169.1 via 192.156.169.14(so-0/0/0)
```

## show route community-name

|                                    |                                                                                                                                                                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1880</a><br><a href="#">Syntax (EX Series Switches) on page 1880</a>                                                                                                                                                                                                                |
| <b>Syntax</b>                      | <b>show route community-name</b> <i>community-name</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                         |
| <b>Syntax (EX Series Switches)</b> | <b>show route community-name</b> <i>community-name</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                 |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                          |
| <b>Description</b>                 | Display the route entries in each routing table that are members of a Border Gateway Protocol (BGP) community, specified by a community name.                                                                                                                                                                  |
| <b>Options</b>                     | <i>community-name</i> —Name of the community.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>       | <a href="#">show route community-name on page 1880</a>                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                 |

## Sample Output

### show route community-name

```

user@host> show route community-name red-com
inet.0: 17 destinations, 17 routes (16 active, 0 holddown, 1 hidden)

inet.3: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

instance1.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.245.212/32 *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204
 AS path: 300 I
 > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
20.20.20.20/32 *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204
 AS path: I
 > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
100.1.4.0/24 *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204

```

```
AS path: I
> to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

bgp.l3vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.245.204:10:10.255.245.212/32
*[BGP/170] 00:06:40, localpref 100, from 10.255.245.204
AS path: 300 I
> to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
10.255.245.204:10:20.20.20.20/32
*[BGP/170] 00:36:02, localpref 100, from 10.255.245.204
AS path: I
> to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
10.255.245.204:10:100.1.4.0/24
*[BGP/170] 00:36:02, localpref 100, from 10.255.245.204
AS path: I
> to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

instance1.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route damping

---

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                           | <a href="#">Syntax on page 1882</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1882</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Syntax                                   | <code>show route damping (decayed   history   suppressed)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Syntax (EX Series Switch and QFX Series) | <code>show route damping (decayed   history   suppressed)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Release Information                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description                              | Display the BGP routes for which updates might have been reduced because of route flap damping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Options                                  | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>decayed</b> —Display route damping entries that might no longer be valid, but are not suppressed.<br><br><b>history</b> —Display entries that have already been withdrawn, but have been logged.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>suppressed</b> —Display entries that have been suppressed and are no longer being installed into the forwarding table or exported by routing protocols. |
| Required Privilege Level                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Related Documentation                    | <ul style="list-style-type: none"><li>• <a href="#">clear bgp damping on page 1392</a></li><li>• <a href="#">show policy damping on page 1434</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| List of Sample Output                    | <a href="#">show route damping decayed detail on page 1885</a><br><a href="#">show route damping history on page 1886</a><br><a href="#">show route damping history detail on page 1886</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Output Fields                            | <a href="#">Table 182 on page 1883</a> lists the output fields for the <b>show route damping</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 182: show route damping Output Fields

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>routing-table-name</i>                    | Name of the routing table—for example, <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels              |
| <b>destinations</b>                          | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels              |
| <b>number routes</b>                         | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b></li> <li>• <b>holddown</b> (routes that are in a pending state before being declared inactive)</li> <li>• <b>hidden</b> (the routes are not used because of a routing policy)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels              |
| <b>destination-prefix (entry, announced)</b> | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>[protocol, preference]</b>                | Protocol from which the route was learned and the preference value for the route. <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p> | All levels              |
| <b>Next-hop reference count</b>              | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b> |
| <b>Source</b>                                | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Next hop</b>                              | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>via</b>                                   | Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Protocol next hop</b>                     | Network layer address of the remote routing device that advertised the prefix. This address is used to derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Indirect next hop</b>                     | Index designation used to specify the mapping between protocol next hops, tags, kernel export policy, and the forwarding next hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>State</b>                                 | Flags for this route. For a description of possible values for this field, see the output field table for the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |

Table 182: show route damping Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Local AS          | AS number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail extensive |
| Peer AS           | AS number of the peer routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Age               | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive |
| Metric            | Metric for the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Task              | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive |
| Announcement bits | List of protocols that announce this route. <i>n-Resolve inet</i> indicates that the route is used for route resolution for next hops found in the routing table. <i>n</i> is an index used by Juniper Networks customer support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail extensive |
| AS path           | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• I—IGP.</li> <li>• E—EGP.</li> <li>• ?—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• [ ]—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device or if AS path prepending is configured.</li> <li>• { }—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• ( )—Parentheses enclose a confederation.</li> <li>• ( [ ] )—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels       |
| to                | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | brief none       |
| via               | Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | brief none       |
| Communities       | Community path attribute for the route. See the output field table for the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Localpref         | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels       |
| Router ID         | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |

Table 182: show route damping Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                        | Level of Output         |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Merit (last update/now)</b> | Last updated and current figure-of-merit value.                                                                                                                          | <b>detail extensive</b> |
| <b>damping-parameters</b>      | Name that identifies the damping parameters used, which is defined in the damping statement at the <b>[edit policy-options]</b> hierarchy level.                         | <b>detail extensive</b> |
| <b>Last update</b>             | Time of most recent change in path attributes.                                                                                                                           | <b>detail extensive</b> |
| <b>First update</b>            | Time of first change in path attributes, which started the route damping process.                                                                                        | <b>detail extensive</b> |
| <b>Flaps</b>                   | Number of times the route has gone up or down or its path attributes have changed.                                                                                       | <b>detail extensive</b> |
| <b>Suppressed</b>              | ( <b>suppressed</b> keyword only) This route is currently suppressed. A suppressed route does not appear in the forwarding table and routing protocols do not export it. | All levels              |
| <b>Reusable in</b>             | ( <b>suppressed</b> keyword only) Time when a suppressed route will again be available.                                                                                  | All levels              |
| <b>Preference will be</b>      | ( <b>suppressed</b> keyword only) Preference value that will be applied to the route when it is again active.                                                            | All levels              |

## Sample Output

### show route damping decayed detail

```

user@host> show route damping decayed detail
inet.0: 173319 destinations, 1533668 routes (172625 active, 4 holddown, 108083
hidden)
10.0.111.0/24 (7 entries, 1 announced)
 *BGP Preference: 170/-101
 Next-hop reference count: 151973
 Source: 172.23.2.129
 Next hop: via so-1/2/0.0
 Next hop: via so-5/1/0.0, selected
 Next hop: via so-6/0/0.0
 Protocol next hop: 172.23.2.129
 Indirect next hop: 89a1a00 264185
 State: <Active Ext>
 Local AS: 65000 Peer AS: 65490
 Age: 3:28 Metric2: 0
 Task: BGP_65490.172.23.2.129+179
 Announcement bits (6): 0-KRT 1-RT 4-KRT 5-BGP.0.0.0.0+179

 6-Resolve tree 2 7-Resolve tree 3
 AS path: 65490 65520 65525 65525 65525 65525 I ()
 Communities: 65501:390 65501:2000 65501:3000 65504:701
 Localpref: 100
 Router ID: 172.23.2.129
 Merit (last update/now): 1934/1790
 damping-parameters: damping-high

```

```
 Last update: 00:03:28 First update: 00:06:40
 Flaps: 2
```

### show route damping history

```
user@host> show route damping history
inet.0: 173320 destinations, 1533529 routes (172624 active, 6 holddown, 108122
hidden)
+ = Active Route, - = Last Active, * = Both

10.108.0.0/15 [BGP] 2d 22:47:58, localpref 100
 AS path: 65220 65501 65502 I
 > to 192.168.60.85 via so-3/1/0.0
```

### show route damping history detail

```
user@host> show route damping history detail
inet.0: 173319 destinations, 1533435 routes (172627 active, 2 holddown, 108105
hidden)
10.108.0.0/15 (3 entries, 1 announced)
 BGP /-101
 Next-hop reference count: 69058
 Source: 192.168.60.85
 Next hop: 192.168.60.85 via so-3/1/0.0, selected
 State: <Hidden Ext>
 Inactive reason: Unusable path
 Local AS: 65000 Peer AS: 65220
 Age: 2d 22:48:10
 Task: BGP_65220.192.168.60.85+179
 AS path: 65220 65501 65502 I ()
 Communities: 65501:390 65501:2000 65501:3000 65504:3561
 Localpref: 100
 Router ID: 192.168.80.25
 Merit (last update/now): 1000/932
 damping-parameters: set-normal
 Last update: 00:01:05 First update: 00:01:05
 Flaps: 1
```



## show route detail

|                                    |                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1887</a><br><a href="#">Syntax (EX Series Switches) on page 1887</a>                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                      | show route detail<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switches)</b> | show route detail<br><destination-prefix>                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                       |
| <b>Description</b>                 | Display detailed information about the active entries in the routing tables.                                                                                                                                                                                                                                                                                |
| <b>Options</b>                     | <p><b>none</b>—Display all active entries in the routing table on all systems.</p> <p><b>destination-prefix</b>—(Optional) Display active entries for the specified address or range of addresses.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>       | <a href="#">show route detail on page 1896</a><br><a href="#">show route detail (with BGP Multipath) on page 1902</a><br><a href="#">show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 1903</a><br><a href="#">show route label detail (Multipoint LDP with Multicast-Only Fast Reroute) on page 1903</a>      |
| <b>Output Fields</b>               | <a href="#">Table 183 on page 1887</a> describes the output fields for the <b>show route detail</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                        |

**Table 183: show route detail Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                         |
| <i>number routes</i>       | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li><b>active</b> (routes that are active)</li> <li><b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li><b>hidden</b> (routes that are not used because of a routing policy)</li> </ul> |

Table 183: show route detail Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>route-destination</i><br>(entry, announced) | <p>Route destination (for example:10.0.0.1/24). The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96).</li> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> |
| label stacking                                 | <p>(Next-to-the-last-hop routing device for MPLS only) Depth of the MPLS label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> <li>• <b>S=0 route</b> indicates that a packet with an incoming label stack depth of 2 or more exits this routing device with one fewer label (the label-popping operation is performed).</li> <li>• If there is no <b>S=</b> information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| [ <i>protocol, preference</i> ]                | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+—</b>A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>- —</b>A hyphen indicates the last active route.</li> <li>• <b>*—</b>An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                                                                      |
| Level                                          | <p>(IS-IS only). In IS-IS, a single AS can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Route Distinguisher                            | IP subnet augmented with a 64-bit prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| PMSI                                           | Provider multicast service interface (MVPN routing table).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 183: show route detail Output Fields (*continued*)

| Field Name                                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Next-hop type</b>                                 | Type of next hop. For a description of possible values for this field, see <a href="#">Table 184 on page 1892</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Next-hop reference count</b>                      | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Flood nexthop branches exceed maximum message</b> | Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Source</b>                                        | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Next hop</b>                                      | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>via</b>                                           | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> </ul> |
| <b>Label-switched-path<br/>lsp-path-name</b>         | Name of the LSP used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Label operation</b>                               | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Interface</b>                                     | (Local only) Local interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Protocol next hop</b>                             | Network layer address of the remote routing device that advertised the prefix. This address is used to derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Indirect next hop</b>                             | Index designation used to specify the mapping between protocol next hops, tags, kernel export policy, and the forwarding next hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>State</b>                                         | State of the route (a route can be in more than one state). See <a href="#">Table 185 on page 1894</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Local AS</b>                                      | AS number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Age</b>                                           | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>AIGP</b>                                          | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 183: show route detail Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Metric</b>            | Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>MED-plus-IGP</b>      | Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>TTL-Action</b>        | For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signaled and LDP-signaled LSPs or for specific VRF routing instances.<br><br>For sample output, see <a href="#">show route table</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Task</b>              | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Announcement bits</b> | The number of BGP peers or protocols to which Junos OS has announced this route, followed by the list of the recipients of the announcement. Junos OS can also announce the route to the KRT for installing the route into the Packet Forwarding Engine, to a resolve tree, a L2 VC, or even a VPN. For example, <b><i>n-Resolve inet</i></b> indicates that the specified route is used for route resolution for next hops found in the routing table.<br><br><ul style="list-style-type: none"> <li><b><i>n</i></b>—An index used by Juniper Networks customer support only.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>AS path</b>           | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li><b>I</b>—IGP.</li> <li><b>E</b>—EGP.</li> <li><b>Recorded</b>—The AS path is recorded by the sample process (sampled).</li> <li><b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li><b>[ ]</b>—Brackets enclose the number that precedes the AS path. This number represents the number of ASs present in the AS path, when calculated as defined in RFC 4271. This value is used in the AS-path merge process, as defined in RFC 4893.</li> <li><b>[ ]</b>—If more than one AS number is configured on the routing device, or if AS path prepending is configured, brackets enclose the local AS number associated with the AS path.</li> <li><b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li><b>( )</b>—Parentheses enclose a confederation.</li> <li><b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |

Table 183: show route detail Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>validation-state</b>        | <p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>—Indicates that the prefix is found, but either the corresponding AS received from the EBGp peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>Unknown</b>—Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>Unverified</b>—Indicates that the origin of the prefix is not verified against the database. This is because the database got populated and the validation is not called for in the BGP import policy, although origin validation is enabled, or the origin validation is not enabled for the BGP peers.</li> <li>• <b>Valid</b>—Indicates that the prefix and autonomous system pair are found in the database.</li> </ul> |
| <b>FECs bound to route</b>     | Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Primary Upstream</b>        | When multipoint LDP with multicast-only fast reroute (MoFRR) is configured, the primary upstream path. MoFRR transmits a multicast join message from a receiver toward a source on a primary path, while also transmitting a secondary multicast join message from the receiver toward the source on a backup path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RPF Nexthops</b>            | When multipoint LDP with MoFRR is configured, the reverse-path forwarding (RPF) next-hop information. Data packets are received from both the primary path and the secondary paths. The redundant packets are discarded at topology merge points due to the RPF checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Label</b>                   | Multiple MPLS labels are used to control MoFRR stream selection. Each label represents a separate route, but each references the same interface list check. Only the primary label is forwarded while all others are dropped. Multiple interfaces can receive packets using the same label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>weight</b>                  | Value used to distinguish MoFRR primary and backup routes. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>VC Label</b>                | MPLS label assigned to the Layer 2 circuit virtual connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>MTU</b>                     | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>VLAN ID</b>                 | VLAN identifier of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Prefixes bound to route</b> | Forwarding equivalent class (FEC) bound to this route. Applicable only to routes installed by LDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Communities</b>             | Community path attribute for the route. See <a href="#">Table 186 on page 1896</a> for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Layer2-info: encaps</b>     | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>control flags</b>           | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>mtu</b>                     | Maximum transmission unit (MTU) information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Label-Base, range</b>       | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>status vector</b>           | Layer 2 VPN and VPLS network layer reachability information (NLRI).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 183: show route detail Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accepted Multipath</b>                  | Current active path when BGP multipath is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Accepted LongLivedStale</b>             | The LongLivedStale flag indicates that the route was marked LLGR-stale by this router, as part of the operation of LLGR receiver mode. Either this flag or the LongLivedStaleImport flag may be displayed for a route. Neither of these flags are displayed at the same time as the Stale (ordinary GR stale) flag.                                                                                                                                                                  |
| <b>Accepted LongLivedStaleImport</b>       | <p>The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy. Either this flag or the LongLivedStale flag may be displayed for a route. Neither of these flags are displayed at the same time as the Stale (ordinary GR stale) flag.</p> <p>Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and import into the inet.0 routing table</p> |
| <b>ImportAccepted LongLivedStaleImport</b> | <p>Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and imported into the inet.0 routing table</p> <p>The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy.</p>                                                                                                                                                                      |
| <b>Accepted MultipathContrib</b>           | Path currently contributing to BGP multipath.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Localpref</b>                           | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Router ID</b>                           | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Primary Routing Table</b>               | In a routing table group, the name of the primary routing table in which the route resides.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Secondary Tables</b>                    | In a routing table group, the name of one or more secondary tables in which the route resides.                                                                                                                                                                                                                                                                                                                                                                                       |

[Table 184 on page 1892](#) describes all possible values for the Next-hop Types output field.

Table 184: Next-Hop Types Output Field Values

| Next-Hop Type            | Description                                                                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Broadcast (bcast)</b> | Broadcast next hop.                                                                                                                                                                                                               |
| <b>Deny</b>              | Deny next hop.                                                                                                                                                                                                                    |
| <b>Discard</b>           | Discard next hop.                                                                                                                                                                                                                 |
| <b>Flood</b>             | Flood next hop. Consists of components called branches, up to a maximum of 32 branches. Each flood next-hop branch sends a copy of the traffic to the forwarding interface. Used by P2MP RSVP, P2MP LDP, P2MP CCC, and multicast. |
| <b>Hold</b>              | Next hop is waiting to be resolved into a unicast or multicast type.                                                                                                                                                              |

Table 184: Next-Hop Types Output Field Values (*continued*)

| Next-Hop Type                   | Description                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indexed (idxd)</b>           | Indexed next hop.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Indirect (indr)</b>          | Used with applications that have a protocol next hop address that is remote. You are likely to see this next-hop type for internal BGP (IBGP) routes when the BGP next hop is a BGP neighbor that is not directly connected.                                                                                                                                                                               |
| <b>Interface</b>                | Used for a network address assigned to an interface. Unlike the router next hop, the interface next hop does not reference any specific node on the network.                                                                                                                                                                                                                                               |
| <b>Local (locl)</b>             | Local address on an interface. This next-hop type causes packets with this destination address to be received locally.                                                                                                                                                                                                                                                                                     |
| <b>Multicast (mcst)</b>         | Wire multicast next hop (limited to the LAN).                                                                                                                                                                                                                                                                                                                                                              |
| <b>Multicast discard (mdsc)</b> | Multicast discard.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Multicast group (mgrp)</b>   | Multicast group member.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Receive (recv)</b>           | Receive.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Reject (rjct)</b>            | Discard. An ICMP unreachable message was sent.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Resolve (rslv)</b>           | Resolving next hop.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Routed multicast (mcrst)</b> | Regular multicast next hop.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Router</b>                   | <p>A specific node or set of nodes to which the routing device forwards packets that match the route prefix.</p> <p>To qualify as next-hop type router, the route must meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Must not be a direct or local subnet for the routing device.</li> <li>• Must have a next hop that is directly connected to the routing device.</li> </ul> |
| <b>Table</b>                    | Routing table next hop.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Unicast (ucst)</b>           | Unicast.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Unilist (ulst)</b>           | List of unicast next hops. A packet sent to this next hop goes to any next hop in the list.                                                                                                                                                                                                                                                                                                                |

Table 185 on page 1894 describes all possible values for the State output field. A route can be in more than one state (for example, **<Active NoReadvrt Int Ext>**).

Table 185: State Output Field Values

| Value                                                    | Description                                                                                                                                                                          |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accounting</b>                                        | Route needs accounting.                                                                                                                                                              |
| <b>Active</b>                                            | Route is active.                                                                                                                                                                     |
| <b>Always Compare MED</b>                                | Path with a lower multiple exit discriminator (MED) is available.                                                                                                                    |
| <b>AS path</b>                                           | Shorter AS path is available.                                                                                                                                                        |
| <b>Cisco Non-deterministic MED selection</b>             | Route is a clone.                                                                                                                                                                    |
| <b>Clone</b>                                             | Cisco nondeterministic MED is enabled and a path with a lower MED is available.                                                                                                      |
| <b>Cluster list length</b>                               | Length of cluster list sent by the route reflector.                                                                                                                                  |
| <b>Delete</b>                                            | Route has been deleted.                                                                                                                                                              |
| <b>Ex</b>                                                | Exterior route.                                                                                                                                                                      |
| <b>Ext</b>                                               | BGP route received from an external BGP neighbor.                                                                                                                                    |
| <b>FlashAll</b>                                          | Forces all protocols to be notified of a change to any route, active or inactive, for a prefix. When not set, protocols are informed of a prefix only when the active route changes. |
| <b>Hidden</b>                                            | Route not used because of routing policy.                                                                                                                                            |
| <b>IfCheck</b>                                           | Route needs forwarding RPF check.                                                                                                                                                    |
| <b>IGP metric</b>                                        | Path through next hop with lower IGP metric is available.                                                                                                                            |
| <b>Inactive reason</b>                                   | Flags for this route, which was not selected as best for a particular destination.                                                                                                   |
| <b>Initial</b>                                           | Route being added.                                                                                                                                                                   |
| <b>Int</b>                                               | Interior route.                                                                                                                                                                      |
| <b>Int Ext</b>                                           | BGP route received from an internal BGP peer or a BGP confederation peer.                                                                                                            |
| <b>Interior &gt; Exterior &gt; Exterior via Interior</b> | Direct, static, IGP, or EBGp path is available.                                                                                                                                      |
| <b>Local Preference</b>                                  | Path with a higher local preference value is available.                                                                                                                              |



Table 185: State Output Field Values (*continued*)

| Value                                 | Description                                                                                                                                                                                                                       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Martian</b>                        | Route is a martian (ignored because it is obviously invalid).                                                                                                                                                                     |
| <b>MartianOK</b>                      | Route exempt from martian filtering.                                                                                                                                                                                              |
| <b>Next hop address</b>               | Path with lower metric next hop is available.                                                                                                                                                                                     |
| <b>No difference</b>                  | Path from neighbor with lower IP address is available.                                                                                                                                                                            |
| <b>NoReadvrt</b>                      | Route not to be advertised.                                                                                                                                                                                                       |
| <b>NotBest</b>                        | Route not chosen because it does not have the lowest MED.                                                                                                                                                                         |
| <b>Not Best in its group</b>          | Incoming BGP AS is not the best of a group (only one AS can be the best).                                                                                                                                                         |
| <b>NotInstall</b>                     | Route not to be installed in the forwarding table.                                                                                                                                                                                |
| <b>Number of gateways</b>             | Path with a greater number of next hops is available.                                                                                                                                                                             |
| <b>Origin</b>                         | Path with a lower origin code is available.                                                                                                                                                                                       |
| <b>Pending</b>                        | Route pending because of a hold-down configured on another route.                                                                                                                                                                 |
| <b>Release</b>                        | Route scheduled for release.                                                                                                                                                                                                      |
| <b>RIB preference</b>                 | Route from a higher-numbered routing table is available.                                                                                                                                                                          |
| <b>Route Distinguisher</b>            | 64-bit prefix added to IP subnets to make them unique.                                                                                                                                                                            |
| <b>Route Metric or MED comparison</b> | Route with a lower metric or MED is available.                                                                                                                                                                                    |
| <b>Route Preference</b>               | Route with lower preference value is available                                                                                                                                                                                    |
| <b>Router ID</b>                      | Path through a neighbor with lower ID is available.                                                                                                                                                                               |
| <b>Secondary</b>                      | Route not a primary route.                                                                                                                                                                                                        |
| <b>Unusable path</b>                  | Path is not usable because of one of the following conditions: <ul style="list-style-type: none"> <li>• The route is damped.</li> <li>• The route is rejected by an import policy.</li> <li>• The route is unresolved.</li> </ul> |
| <b>Update source</b>                  | Last tiebreaker is the lowest IP address value.                                                                                                                                                                                   |

Table 186 on page 1896 describes the possible values for the Communities output field.

Table 186: Communities Output Field Values

| Value                                                   | Description                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>area-number</i>                                      | 4 bytes, encoding a 32-bit area number. For AS-external routes, the value is <b>0</b> . A nonzero value identifies the route as internal to the OSPF domain, and as within the identified area. Area numbers are relative to a particular OSPF domain.                                                  |
| <b>bandwidth: local AS number:link-bandwidth-number</b> | Link-bandwidth community value used for unequal-cost load balancing. When BGP has several candidate paths available for multipath purposes, it does not perform unequal-cost load balancing according to the link-bandwidth community unless all candidate paths have this attribute.                   |
| <b>domain-id</b>                                        | Unique configurable number that identifies the OSPF domain.                                                                                                                                                                                                                                             |
| <b>domain-id-vendor</b>                                 | Unique configurable number that further identifies the OSPF domain.                                                                                                                                                                                                                                     |
| <i>link-bandwidth-number</i>                            | Link-bandwidth number: from <b>0</b> through <b>4,294,967,295</b> (bytes per second).                                                                                                                                                                                                                   |
| <i>local AS number</i>                                  | Local AS number: from <b>1</b> through <b>65,535</b> .                                                                                                                                                                                                                                                  |
| <i>options</i>                                          | 1 byte. Currently this is only used if the route type is <b>5</b> or <b>7</b> . Setting the least significant bit in the field indicates that the route carries a type 2 metric.                                                                                                                        |
| <b>origin</b>                                           | (Used with VPNs) Identifies where the route came from.                                                                                                                                                                                                                                                  |
| <i>ospf-route-type</i>                                  | 1 byte, encoded as <b>1</b> or <b>2</b> for intra-area routes (depending on whether the route came from a type 1 or a type 2 LSA); <b>3</b> for summary routes; <b>5</b> for external routes (area number must be <b>0</b> ); <b>7</b> for NSSA routes; or <b>129</b> for sham link endpoint addresses. |
| <b>route-type-vendor</b>                                | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute <b>0x8000</b> . The format is <b>area-number:ospf-route-type:options</b> .                                                                                            |
| <b>rte-type</b>                                         | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute <b>0x0306</b> . The format is <b>area-number:ospf-route-type:options</b> .                                                                                            |
| <b>target</b>                                           | Defines which VPN the route participates in; <b>target</b> has the format <b>32-bit IP address:16-bit number</b> . For example, 10.19.0.0:100.                                                                                                                                                          |
| <b>unknown IANA</b>                                     | Incoming IANA codes with a value between <b>0x1</b> and <b>0x7fff</b> . This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                        |
| <b>unknown OSPF vendor community</b>                    | Incoming IANA codes with a value above <b>0x8000</b> . This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                                         |

## Sample Output

### show route detail

```
user@host> show route detail
```

```
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
```

```

10.10.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 29
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 1:31:43
 Task: RT
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

10.31.1.0/30 (2 entries, 1 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 2
 Next hop: via so-0/3/0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:30:17
 Task: IF
 Announcement bits (1): 3-Resolve tree 2
 AS path: I
 OSPF Preference: 10
 Next-hop reference count: 1
 Next hop: via so-0/3/0.0, selected
 State: <Int>
 Inactive reason: Route Preference
 Local AS: 69
 Age: 1:30:17 Metric: 1
 Area: 0.0.0.0
 Task: OSPF
 AS path: I

10.31.1.1/32 (1 entry, 1 announced)
 *Local Preference: 0
 Next hop type: Local
 Next-hop reference count: 7
 Interface: so-0/3/0.0
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:30:20
 Task: IF
 Announcement bits (1): 3-Resolve tree 2
 AS path: I

...

10.31.2.0/30 (1 entry, 1 announced)
 *OSPF Preference: 10
 Next-hop reference count: 9
 Next hop: via so-0/3/0.0
 Next hop: 10.31.1.6 via ge-3/1/0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:29:56 Metric: 2
 Area: 0.0.0.0
 Task: OSPF
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

...

```

```
224.0.0.2/32 (1 entry, 1 announced)
 *PIM Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:45
 Task: PIM Recv
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

...

224.0.0.22/32 (1 entry, 1 announced)
 *IGMP Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:43
 Task: IGMP
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.255.70.103/32 (1 entry, 1 announced)
 State: <FlashAll>
 *RSVP Preference: 7
 Next-hop reference count: 6
 Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
 Label-switched-path green-r1-r3
 Label operation: Push 100096
 State: <Active Int>
 Local AS: 69
 Age: 1:25:49 Metric: 2
 Task: RSVP
 Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
 AS path: I

10.255.71.238/32 (1 entry, 1 announced)
 State: <FlashAll>
 *RSVP Preference: 7
 Next-hop reference count: 6
 Next hop: via so-0/3/0.0 weight 0x1, selected
 Label-switched-path green-r1-r2
 State: <Active Int>
 Local AS: 69
 Age: 1:25:49 Metric: 1
 Task: RSVP
 Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
 AS path: I

private__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

47.0005.80ff.f800.0000.0108.0001.0102.5507.1052/152 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
```

```

 State: <Active Int>
 Local AS: 69
 Age: 1:31:44
 Task: IF
 AS path: I

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
0 (1 entry, 1 announced)
 *MPLS Preference: 0
 Next hop type: Receive
 Next-hop reference count: 6
 State: <Active Int>
 Local AS: 69
 Age: 1:31:45 Metric: 1
 Task: MPLS
 Announcement bits (1): 0-KRT
 AS path: I

...

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
299776 (1 entry, 1 announced)
TSI:
KRT in-kerne1 299776 /52 -> {Flood}
 *RSVP Preference: 7
 Next hop type: Flood
 Next-hop reference count: 130
 Flood nexthop branches exceed maximum
 Address: 0x8ea65d0

...

299840 (1 entry, 1 announced)
TSI:
KRT in-kerne1 299840 /52 -> {indirect(1048575)}
 *RSVP Preference: 7/2
 Next hop type: Flood
 Address: 0x9174a30
 Next-hop reference count: 4
 Next hop type: Router, Next hop index: 798
 Address: 0x9174c28
 Next-hop reference count: 2
 Next hop: 8.0.0.2 via lt-1/2/0.9 weight 0x1
 Label-switched-path R2-to-R4-2p2mp
 Label operation: Pop
 Next hop type: Router, Next hop index: 1048574
 Address: 0x92544f0
 Next-hop reference count: 2
 Next hop: 7.0.0.2 via lt-1/2/0.7 weight 0x1
 Label-switched-path R2-to-R200-p2mp
 Label operation: Pop
 Next hop: 6.0.0.2 via lt-1/2/0.5 weight 0x8001
 Label operation: Pop
 State: <Active Int>
 Age: 1:29 Metric: 1
 Task: RSVP
 Announcement bits (1): 0-KRT
 AS path: I...

800010 (1 entry, 1 announced)
 *VPLS Preference: 7
 Next-hop reference count: 2

```

```

Next hop: via vt-3/2/0.32769, selected
Label operation: Pop
State: <Active Int>
Age: 1:29:30
Task: Common L2 VC
Announcement bits (1): 0-KRT
AS path: I

vt-3/2/0.32769 (1 entry, 1 announced)
 *VPLS Preference: 7
 Next-hop reference count: 2
 Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
 Label-switched-path green-r1-r3
 Label operation: Push 800012, Push 100096(top)
 Protocol next hop: 10.255.70.103
 Push 800012
 Indirect next hop: 87272e4 1048574
 State: <Active Int>
 Age: 1:29:30 Metric2: 2
 Task: Common L2 VC
 Announcement bits (2): 0-KRT 1-Common L2 VC
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

abcd::10:255:71:52/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:31:44
 Task: IF
 AS path: I

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:44
 Task: IF
 AS path: I

ff02::2/128 (1 entry, 1 announced)
 *PIM Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:45
 Task: PIM Recv6
 Announcement bits (1): 0-KRT
 AS path: I

ff02::d/128 (1 entry, 1 announced)
 *PIM Preference: 0

```

```

 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:45
 Task: PIM Recv6
 Announcement bits (1): 0-KRT
 AS path: I

ff02::16/128 (1 entry, 1 announced)
 *MLD Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:31:43
 Task: MLD
 Announcement bits (1): 0-KRT
 AS path: I

private.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.16385, selected
 State: <Active NoReadvrt Int>
 Age: 1:31:44
 Task: IF
 AS path: I

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

10.255.70.103:1:3:1/96 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.70.103:1
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Secondary Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 1:25:49 Metric2: 1
 AIGP 210
 Task: BGP_69.10.255.70.103+179
 Announcement bits (1): 0-green-l2vpn
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0
 Label-base: 800008, range: 8
 Localpref: 100
 Router ID: 10.255.70.103
 Primary Routing Table bgp.l2vpn.0

10.255.71.52:1:1:1/96 (1 entry, 1 announced)
 *L2VPN Preference: 170/-1
 Next-hop reference count: 5
 Protocol next hop: 10.255.71.52
 Indirect next hop: 0 -
 State: <Active Int Ext>
 Age: 1:31:40 Metric2: 1
 Task: green-l2vpn

```

```

Announcement bits (1): 1-BGP.0.0.0+179
AS path: I
Communities: Layer2-info: encaps:VPLS, control flags:Site-Down,
mtu: 0
Label-base: 800016, range: 8, status-vector: 0x9F

10.255.71.52:1:5:1/96 (1 entry, 1 announced)
 *L2VPN Preference: 170/-101
 Next-hop reference count: 5
 Protocol next hop: 10.255.71.52
 Indirect next hop: 0 -
 State: <Active Int Ext>
 Age: 1:31:40 Metric2: 1
 Task: green-l2vpn
 Announcement bits (1): 1-BGP.0.0.0+179
 AS path: I
 Communities: Layer2-info: encaps:VPLS, control flags:, mtu: 0
 Label-base: 800008, range: 8, status-vector: 0x9F

...

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
 *L2CKT Preference: 7
 Next hop: via so-1/1/2.0 weight 1, selected
 Label-switched-path my-lsp
 Label operation: Push 100000[0]
 Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
 State: <Active Int>
 Local AS: 99
 Age: 10:21
 Task: l2 circuit
 Announcement bits (1): 0-LDP
 AS path: I
 VC Label 100000, MTU 1500, VLAN ID 512

```

### show route detail (with BGP Multipath)

```

user@host> show route detail

10.1.1.8/30 (2 entries, 1 announced)
 *BGP Preference: 170/-101
 Next hop type: Router, Next hop index: 262142
 Address: 0x901a010
 Next-hop reference count: 2
 Source: 10.1.1.2
 Next hop: 10.1.1.2 via lt-0/3/0.1, selected
 Next hop: 10.1.1.6 via lt-0/3/0.5
 State: <Active Ext>
 Local AS: 1 Peer AS: 2
 Age: 5:04:43
 Task: BGP_2.10.1.1.2+59955
 Announcement bits (1): 0-KRT
 AS path: 2 I
 Accepted Multipath
 Localpref: 100
 Router ID: 1.1.1.2
 BGP Preference: 170/-101
 Next hop type: Router, Next hop index: 678
 Address: 0x8f97520
 Next-hop reference count: 9

```



```

Source: 10.1.1.6
Next hop: 10.1.1.6 via lt-0/3/0.5, selected
State: <NotBest Ext>
Inactive reason: Not Best in its group - Active preferred
Local AS: 1 Peer AS: 2
Age: 5:04:43
Task: BGP_2.10.1.1.6+58198
AS path: 2 I
Accepted MultipathContrib
Localpref: 100
Router ID: 1.1.1.3

```

### show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show route label 299872 detail
mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
 *LDP Preference: 9
 Next hop type: Flood
 Next-hop reference count: 3
 Address: 0x9097d90
 Next hop: via vt-0/1/0.1
 Next-hop index: 661
 Label operation: Pop
 Address: 0x9172130
 Next hop: via so-0/0/3.0
 Next-hop index: 654
 Label operation: Swap 299872
 State: **Active Int>
 Local AS: 1001
 Age: 8:20 Metric: 1
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 FECs bound to route: P2MP root-addr 10.255.72.166, grp 232.1.1.1,
src 192.168.142.2

```

### show route label detail (Multipoint LDP with Multicast-Only Fast Reroute)

```

user@host> show route label 301568 detail
mpls.0: 18 destinations, 18 routes (18 active, 0 holddown, 0 hidden)
301568 (1 entry, 1 announced)
 *LDP Preference: 9
 Next hop type: Flood
 Address: 0x2735208
 Next-hop reference count: 3
 Next hop type: Router, Next hop index: 1397
 Address: 0x2735d2c
 Next-hop reference count: 3
 Next hop: 1.3.8.2 via ge-1/2/22.0
 Label operation: Pop
 Load balance label: None;
 Next hop type: Router, Next hop index: 1395
 Address: 0x2736290
 Next-hop reference count: 3
 Next hop: 1.3.4.2 via ge-1/2/18.0
 Label operation: Pop
 Load balance label: None;
 State: <Active Int AckRequest MulticastRPF>
 Local AS: 10

```

```

Age: 54:05 Metric: 1
Validation State: unverified
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
FECs bound to route: P2MP root-addr 1.1.1.1, grp: 232.1.1.1, src:
192.168.219.11
Primary Upstream : 1.1.1.3:0--1.1.1.2:0
 RPF Nexthops :
 ge-1/2/15.0, 1.2.94.1, Label: 301568, weight: 0x1
 ge-1/2/14.0, 1.2.3.1, Label: 301568, weight: 0x1
Backup Upstream : 1.1.1.3:0--1.1.1.6:0
 RPF Nexthops :
 ge-1/2/20.0, 1.2.96.1, Label: 301584, weight: 0xffffe
 ge-1/2/19.0, 1.3.6.1, Label: 301584, weight: 0xffffe

```

## show route exact

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1905</a><br><a href="#">Syntax (EX Series Switches) on page 1905</a>                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                      | <b>show route exact</b> <i>destination-prefix</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | <b>show route exact</b> <i>destination-prefix</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                             |
| <b>Description</b>                 | Display only the routes that exactly match the specified address or range of addresses.                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>destination-prefix</b> —Address or range of addresses.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>       | <a href="#">show route exact on page 1905</a><br><a href="#">show route exact detail on page 1905</a><br><a href="#">show route exact extensive on page 1906</a><br><a href="#">show route exact terse on page 1906</a>                                                                                                                                                                           |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                    |

## Sample Output

### show route exact

```

user@host> show route exact 207.17.136.0/24

inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
207.17.136.0/24 *[Static/5] 2d 03:30:22
 > to 192.168.71.254 via fxp0.0

```

### show route exact detail

```

user@host> show route exact 207.17.136.0/24 detail

inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)

```

```
Restart Complete
207.17.136.0/24 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 29
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 2d 3:30:26
 Task: RT
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I
```

#### show route exact extensive

```
user@host> show route exact 207.17.136.0/24 extensive
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
207.17.136.0/24 (1 entry, 1 announced)
TSI:
KRT in-kernel 207.17.136.0/24 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 29
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 1:25:18
 Task: RT
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I
```

#### show route exact terse

```
user@host> show route exact 207.17.136.0/24 terse

inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 207.17.136.0/24 S 5 >192.168.71.254
```

## show route export

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1907</a><br><a href="#">Syntax (EX Series Switches) on page 1907</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                      | <pre>show route export &lt;brief   detail&gt; &lt;instance &lt;instance-name&gt;   routing-table-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (EX Series Switches)</b> | <pre>show route export &lt;brief   detail&gt; &lt;instance &lt;instance-name&gt;   routing-table-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                 | Display policy-based route export information. Policy-based export simplifies the process of exchanging route information between routing instances.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                     | <p><b>none</b>—(Same as <b>brief</b>.) Display standard information about policy-based export for all instances and routing tables on all systems.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance &lt;instance-name&gt;</b>—(Optional) Display a particular routing instance for which policy-based export is currently enabled.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>routing-table-name</b>—(Optional) Display information about policy-based export for all routing tables whose name begins with this string (for example, <b>inet.0</b> and <b>inet6.0</b> are both displayed when you run the <b>show route export inet</b> command).</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>       | <a href="#">show route export on page 1908</a><br><a href="#">show route export detail on page 1908</a><br><a href="#">show route export instance detail on page 1908</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>               | <a href="#">Table 187 on page 1907</a> lists the output fields for the <b>show route export</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 187: show route export Output Fields**

| Field Name                 | Field Description                                                                                                                                           | Level of Output   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Table or table-name</b> | Name of the routing tables that either import or export routes.                                                                                             | All levels        |
| <b>Routes</b>              | Number of routes exported from this table into other tables. If a particular route is exported to different tables, the counter will only increment by one. | <b>brief</b> none |

Table 187: show route export Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                           | Level of Output   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Export</b>        | Whether the table is currently exporting routes to other tables: <b>Y</b> or <b>N</b> (Yes or No).                                                                                                                                                                                                                                                                          | <b>brief none</b> |
| <b>Import</b>        | Tables currently importing routes from the originator table. (Not displayed for tables that are not exporting any routes.)                                                                                                                                                                                                                                                  | <b>detail</b>     |
| <b>Flags</b>         | ( <b>instance</b> keyword only) Flags for this feature on this instance: <ul style="list-style-type: none"> <li><b>config auto-policy</b>—The policy was deduced from the configured IGP export policies.</li> <li><b>cleanup</b>—Configuration information for this instance is no longer valid.</li> <li><b>config</b>—The instance was explicitly configured.</li> </ul> | <b>detail</b>     |
| <b>Options</b>       | ( <b>instance</b> keyword only) Configured option displays the type of routing tables the feature handles: <ul style="list-style-type: none"> <li><b>unicast</b>—Indicates <i>instance.inet.0</i>.</li> <li><b>multicast</b>—Indicates <i>instance.inet.2</i>.</li> <li><b>unicast multicast</b>—Indicates <i>instance.inet.0</i> and <i>instance.inet.2</i>.</li> </ul>    | <b>detail</b>     |
| <b>Import policy</b> | ( <b>instance</b> keyword only) Policy that <b>route export</b> uses to construct the import-export matrix. Not displayed if the instance type is <b>vrf</b> .                                                                                                                                                                                                              | <b>detail</b>     |
| <b>Instance</b>      | ( <b>instance</b> keyword only) Name of the routing instance.                                                                                                                                                                                                                                                                                                               | <b>detail</b>     |
| <b>Type</b>          | ( <b>instance</b> keyword only) Type of routing instance: <b>forwarding</b> , <b>non-forwarding</b> , or <b>vrf</b> .                                                                                                                                                                                                                                                       | <b>detail</b>     |

## Sample Output

### show route export

```

user@host> show route export
Table Export Routes
inet.0 N 0
black.inet.0 Y 3
red.inet.0 Y 4

```

### show route export detail

```

user@host> show route export detail
inet.0 Routes: 0
black.inet.0 Routes: 3
 Import: [inet.0]
red.inet.0 Routes: 4
 Import: [inet.0]

```

### show route export instance detail

```

user@host> show route export instance detail
Instance: master Type: forwarding
Flags: <config auto-policy> Options: <unicast multicast>
Import policy: [(ospf-master-from-red || isis-master-from-black)]

```

Instance: black  
Instance: red

Type: non-forwarding  
Type: non-forwarding

## show route export vrf-target

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route export vrf-target<br><brief   detail><br><community <i>community--regular-expression</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display the VPN routing and forwarding (VRF) target communities for which policy-based route export is currently distributing routes. This command is relevant when there are overlapping virtual private networks (VPNs).                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about all target communities.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.</p> <p><b>community <i>community-regular-expression</i></b>—(Optional) Display information about the specified community.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show route export vrf-target on page 1911</a><br><a href="#">show route export vrf-target community on page 1911</a><br><a href="#">show route export vrf-target detail on page 1911</a>                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | Table 188 on page 1910 lists the output fields for the <b>show route export vrf-target</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                               |

Table 188: show route export vrf-target Output Fields

| Field Name                      | Field Description                                                                                                                                                                                                                                                                    | Level of Output |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Route target                    | Target communities for which auto-export is currently distributing routes.                                                                                                                                                                                                           | brief none      |
| Family                          | Routing table entries for the specified family.                                                                                                                                                                                                                                      | brief none      |
| <i>type-of-routing-table(s)</i> | Type of routing tables the feature handles: <ul style="list-style-type: none"> <li>unicast—Indicates <i>instance.inet.0</i>.</li> <li>multicast—Indicates <i>instance.inet.2</i>.</li> <li>unicast multicast—Indicates <i>instance.inet.0</i> and <i>instance.inet.2</i>.</li> </ul> | brief none      |
| Import                          | Number of routing tables that are currently importing routes with this target community. Omitted for tables that are not importing routes.                                                                                                                                           | brief none      |



Table 188: show route export vrf-target Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                          | Level of Output   |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Export</b>          | Number of routing tables that are currently exporting routes with this target community. Omitted for tables that are not exporting routes. | <b>brief</b> none |
| <b>Target</b>          | Target communities, family, and options for which auto-export is currently distributing routes.                                            | <b>detail</b>     |
| <b>Import table(s)</b> | Name of the routing tables that are importing a particular route target.                                                                   | <b>detail</b>     |
| <b>Export table(s)</b> | Name of the routing tables that are exporting a particular route target.                                                                   | <b>detail</b>     |

## Sample Output

### show route export vrf-target

```

user@host> show route export vrf-target
Route Target Family Import Export
69:1 inet unicast 2 2
69:2 inet unicast 2 2

```

### show route export vrf-target community

```

user@host> show route export vrf-target community target:69:1
Route Target Family Import Export
69:1 inet unicast 2 2

```

### show route export vrf-target detail

```

user@host> show route export vrf-target detail
Target: 1:12 inet unicast
 Import table(s): vrf-11.inet.0 vrf-12.inet.0
 Export table(s): vrf-12.inet.0
Target: 1:13 inet unicast
 Import table(s): vrf-12.inet.0 vrf-13.inet.0
 Export table(s): vrf-13.inet.0

```

## show route extensive

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1912</a><br><a href="#">Syntax (EX Series Switches) on page 1912</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                      | show route extensive<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switches)</b> | show route extensive<br><destination-prefix>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>                 | Display extensive information about the active entries in the routing tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                     | <b>none</b> —Display all active entries in the routing table.<br><br><b>destination-prefix</b> —(Optional) Display active entries for the specified address or range of addresses.<br><br><b>logical-system (all   logical-system-name)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>       | <a href="#">show route extensive on page 1919</a><br><a href="#">show route extensive (Access Route) on page 1925</a><br><a href="#">show route extensive (BGP PIC Edge) on page 1926</a><br><a href="#">show route extensive (FRR and LFA) on page 1926</a><br><a href="#">show route extensive (Route Reflector) on page 1927</a><br><a href="#">show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 1927</a><br><a href="#">show route label detail (Multipoint LDP with Multicast-Only Fast Reroute) on page 1928</a> |
| <b>Output Fields</b>               | <a href="#">Table 189 on page 1912</a> describes the output fields for the <b>show route extensive</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                              |

**Table 189: show route extensive Output Fields**

| Field Name                 | Field Description                                                       |
|----------------------------|-------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                        |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table. |

Table 189: show route extensive Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>number routes</i>                           | <p>Number of routes in the routing table and total number of routes in the following states:</p> <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active).</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive).</li> <li>• <b>hidden</b> (routes that are not used because of a routing policy).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>route-destination</i><br>(entry, announced) | <p>Route destination (for example: 10.0.0.1/24). The <b>entry</b> value is the number of route for this destination, and the <b>announced</b> value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96). <ul style="list-style-type: none"> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> </li> </ul> |
| <b>TSI</b>                                     | Protocol header information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>label stacking</b>                          | <p>(Next-to-the-last-hop routing device for MPLS only) Depth of the Multiprotocol Label Switching (MPLS) label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> <li>• <b>S=0 route</b> indicates that a packet with an incoming label stack depth of two or more exits this router with one fewer label (the label-popping operation is performed).</li> <li>• If there is no <b>S=</b> information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>[protocol, preference]</b>                  | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+—</b>A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>—</b>A hyphen indicates the last active route.</li> <li>• <b>*—</b>An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                             |

Table 189: show route extensive Output Fields (*continued*)

| Field Name                                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level</b>                                         | (IS-IS only). In IS-IS, a single autonomous system (AS) can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Route Distinguisher</b>                           | IP subnet augmented with a 64-bit prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>PMSI</b>                                          | Provider multicast service interface (MVPN routing table).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Next-hop type</b>                                 | Type of next hop. For a description of possible values for this field, see the Output Field table in the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Next-hop reference count</b>                      | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Flood nexthop branches exceed maximum message</b> | Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Source</b>                                        | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Next hop</b>                                      | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>via</b>                                           | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when Multiprotocol Label Switching (MPLS) label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable Border Gateway Protocol (BGP) multipath load balancing.</li> </ul> |
| <b>Label-switched-path lsp-path-name</b>             | Name of the label-switched path (LSP) used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Label operation</b>                               | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Offset</b>                                        | Whether the metric has been increased or decreased by an offset value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Interface</b>                                     | (Local only) Local interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Protocol next hop</b>                             | Network layer address of the remote routing device that advertised the prefix. This address is used to recursively derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 189: show route extensive Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>label-operation</i></b> | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                 |
| <b>Indirect next hops</b>     | <p>When present, a list of nodes that are used to resolve the path to the next-hop destination, in the order that they are resolved.</p> <p>When BGP PIC Edge is enabled, the output lines that contain <b>Indirect next hop: weight</b> follow next hops that the software can use to repair paths where a link failure occurs. The next-hop weight has one of the following values:</p> <ul style="list-style-type: none"> <li>• 0x1 indicates active next hops.</li> <li>• 0x4000 indicates passive next hops.</li> </ul> |
| <b>State</b>                  | State of the route (a route can be in more than one state). See the Output Field table in the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Session ID</b>             | The BFD session ID number that represents the protection using MPLS fast reroute (FRR) and loop-free alternate (LFA).                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Weight</b>                 | <p>Weight for the backup path. If the weight of an indirect next hop is larger than zero, the weight value is shown.</p> <p>For sample output, see <a href="#">show route table</a>.</p>                                                                                                                                                                                                                                                                                                                                     |

Table 189: show route extensive Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inactive reason | <p>If the route is inactive, the reason for its current state is indicated. Typical reasons include:</p> <ul style="list-style-type: none"> <li>• <b>Active preferred</b>—Currently active route was selected over this route.</li> <li>• <b>Always compare MED</b>—Path with a lower multiple exit discriminator (MED) is available.</li> <li>• <b>AS path</b>—Shorter AS path is available.</li> <li>• <b>Cisco Non-deterministic MED selection</b>—Cisco nondeterministic MED is enabled and a path with a lower MED is available.</li> <li>• <b>Cluster list length</b>—Path with a shorter cluster list length is available.</li> <li>• <b>Forwarding use only</b>—Path is only available for forwarding purposes.</li> <li>• <b>IGP metric</b>—Path through the next hop with a lower IGP metric is available.</li> <li>• <b>IGP metric type</b>—Path with a lower OSPF link-state advertisement type is available.</li> <li>• <b>Interior &gt; Exterior &gt; Exterior via Interior</b>—Direct, static, IGP, or EBGp path is available.</li> <li>• <b>Local preference</b>—Path with a higher local preference value is available.</li> <li>• <b>Next hop address</b>—Path with a lower metric next hop is available.</li> <li>• <b>No difference</b>—Path from a neighbor with a lower IP address is available.</li> <li>• <b>Not Best in its group</b>—Occurs when multiple peers of the same external AS advertise the same prefix and are grouped together in the selection process. When this reason is displayed, an additional reason is provided (typically one of the other reasons listed).</li> <li>• <b>Number of gateways</b>—Path with a higher number of next hops is available.</li> <li>• <b>Origin</b>—Path with a lower origin code is available.</li> <li>• <b>OSPF version</b>—Path does not support the indicated OSPF version.</li> <li>• <b>RIB preference</b>—Route from a higher-numbered routing table is available.</li> <li>• <b>Route distinguisher</b>—64-bit prefix added to IP subnets to make them unique.</li> <li>• <b>Route metric or MED comparison</b>—Route with a lower metric or MED is available.</li> <li>• <b>Route preference</b>—Route with a lower preference value is available.</li> <li>• <b>Router ID</b>—Path through a neighbor with a lower ID is available.</li> <li>• <b>Unusable path</b>—Path is not usable because of one of the following conditions: the route is damped, the route is rejected by an import policy, or the route is unresolved.</li> <li>• <b>Update source</b>—Last tiebreaker is the lowest IP address value.</li> </ul> |
| Local AS        | Autonomous system (AS) number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Age             | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| AIGP            | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Metric          | Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MED-plus-IGP    | Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| TTL-Action      | <p>For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signalled and LDP-signalled LSPs or for specific VRF routing instances.</p> <p>For sample output, see <a href="#">show route table</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 189: show route extensive Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Task</b>                          | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Announcement bits</b>             | List of protocols that announce this route. <b>n-Resolve inet</b> indicates that the route is used for route resolution for next hops found in the routing table. <b>n</b> is an index used by Juniper Networks customer support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>AS path</b>                       | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>Recorded</b>—The AS path is recorded by the sample process (sampled).</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device, or if AS path prepending is configured.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |
| <b>validation-state</b>              | <p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>—Indicates that the prefix is found, but either the corresponding AS received from the EBGp peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>Unknown</b>—Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>Unverified</b>—Indicates that origin validation is not enabled for the BGP peers.</li> <li>• <b>Valid</b>—Indicates that the prefix and autonomous system pair are found in the database.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>FECs bound to route</b>           | Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>AS path: I &lt;Originator&gt;</b> | (For route reflected output only) Originator ID attribute set by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 189: show route extensive Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>route status</b>     | <p>Indicates the status of a BGP route:</p> <ul style="list-style-type: none"> <li>• <b>Accepted</b>—The specified BGP route is imported by the default BGP policy.</li> <li>• <b>Import</b>—The route is imported into a Layer 3 VPN routing instance.</li> <li>• <b>Import-Protect</b>—A remote instance egress that is protected.</li> <li>• <b>Multipath</b>—A BGP multipath active route.</li> <li>• <b>MultipathContrib</b>—The route is not active but contributes to the BGP multipath.</li> <li>• <b>Protect</b>—An egress route that is protected.</li> <li>• <b>Stale</b>—A route that is marked stale due to graceful restart.</li> </ul> |
| Primary Upstream        | When multipoint LDP with multicast-only fast reroute (MoFRR) is configured, the primary upstream path. MoFRR transmits a multicast join message from a receiver toward a source on a primary path, while also transmitting a secondary multicast join message from the receiver toward the source on a backup path.                                                                                                                                                                                                                                                                                                                                   |
| RPF Nexthops            | When multipoint LDP with MoFRR is configured, the reverse-path forwarding (RPF) next-hop information. Data packets are received from both the primary path and the secondary paths. The redundant packets are discarded at topology merge points due to the RPF checks.                                                                                                                                                                                                                                                                                                                                                                               |
| Label                   | Multiple MPLS labels are used to control MoFRR stream selection. Each label represents a separate route, but each references the same interface list check. Only the primary label is forwarded while all others are dropped. Multiple interfaces can receive packets using the same label.                                                                                                                                                                                                                                                                                                                                                           |
| weight                  | Value used to distinguish MoFRR primary and backup routes. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VC Label                | MPLS label assigned to the Layer 2 circuit virtual connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MTU                     | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| VLAN ID                 | VLAN identifier of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Cluster list            | (For route reflected output only) Cluster ID sent by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Originator ID           | (For route reflected output only) Address of router that originally sent the route to the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Prefixes bound to route | Forwarding Equivalent Class (FEC) bound to this route. Applicable only to routes installed by LDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Communities             | Community path attribute for the route. See the Output Field table in the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Layer2-info: encaps     | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| control flags           | Control flags: <b>none</b> or Site Down.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| mtu                     | Maximum transmission unit (MTU) information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Label-Base, range       | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



Table 189: show route extensive Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>status vector</b>         | Layer 2 VPN and VPLS network layer reachability information (NLRI).                                                                                                                                                                                                                                              |
| <b>Localpref</b>             | Local preference value included in the route.                                                                                                                                                                                                                                                                    |
| <b>Router ID</b>             | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                 |
| <b>Primary Routing Table</b> | In a routing table group, the name of the primary routing table in which the route resides.                                                                                                                                                                                                                      |
| <b>Secondary Tables</b>      | In a routing table group, the name of one or more secondary tables in which the route resides.                                                                                                                                                                                                                   |
| <b>Originating RIB</b>       | Name of the routing table whose active route was used to determine the forwarding next-hop entry in the resolution database. For example, in the case of inet.0 resolving through inet.0 and inet.3, this field indicates which routing table, inet.0 or inet.3, provided the best path for a particular prefix. |
| <b>Node path count</b>       | Number of nodes in the path.                                                                                                                                                                                                                                                                                     |
| <b>Forwarding nexthops</b>   | Number of forwarding next hops. The forwarding next hop is the network layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.                                                                                                                            |

## Sample Output

### show route extensive

```

user@host> show route extensive
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 29
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 1:34:06
 Task: RT
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

10.31.1.0/30 (2 entries, 1 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 2
 Next hop: via so-0/3/0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:32:40
 Task: IF
 Announcement bits (1): 3-Resolve tree 2
 AS path: I
 OSPF Preference: 10
 Next-hop reference count: 1
 Next hop: via so-0/3/0.0, selected

```

```

 State: <Int>
 Inactive reason: Route Preference
 Local AS: 69
 Age: 1:32:40 Metric: 1
 Area: 0.0.0.0
 Task: OSPF
 AS path: I

10.31.1.1/32 (1 entry, 1 announced)
 *Local Preference: 0
 Next hop type: Local
 Next-hop reference count: 7
 Interface: so-0/3/0.0
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:32:43
 Task: IF
 Announcement bits (1): 3-Resolve tree 2
 AS path: I

...

10.31.2.0/30 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.31.2.0/30 -> {10.31.1.6}
 *OSPF Preference: 10
 Next-hop reference count: 9
 Next hop: via so-0/3/0.0
 Next hop: 10.31.1.6 via ge-3/1/0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:32:19 Metric: 2
 Area: 0.0.0.0
 Task: OSPF
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

...

224.0.0.2/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 224.0.0.2/32 -> {}
 *PIM Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:08
 Task: PIM Recv
 Announcement bits (2): 0-KRT 3-Resolve tree 2
 AS path: I

...

224.0.0.22/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 224.0.0.22/32 -> {}
 *IGMP Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:06

```

```

Task: IGMP
Announcement bits (2): 0-KRT 3-Resolve tree 2
AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.255.70.103/32 (1 entry, 1 announced)
State: <FlashAll>
*RSVP Preference: 7
Next-hop reference count: 6
Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
Label-switched-path green-r1-r3
Label operation: Push 100096
State: <Active Int>
Local AS: 69
Age: 1:28:12 Metric: 2
Task: RSVP
Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
AS path: I

10.255.71.238/32 (1 entry, 1 announced)
State: <FlashAll>
*RSVP Preference: 7
Next-hop reference count: 6
Next hop: via so-0/3/0.0 weight 0x1, selected
Label-switched-path green-r1-r2
State: <Active Int>
Local AS: 69
Age: 1:28:12 Metric: 1
Task: RSVP
Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
AS path: I

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

...

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

47.0005.80ff.f800.0000.0108.0001.0102.5507.1052/152 (1 entry, 0 announced)
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 1
Next hop: via lo0.0, selected
State: <Active Int>
Local AS: 69
Age: 1:34:07
Task: IF
AS path: I

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

0 (1 entry, 1 announced)
TSI:
KRT in-kernel 0 /36 -> {}
*MPLS Preference: 0
Next hop type: Receive
Next-hop reference count: 6
State: <Active Int>
Local AS: 69
Age: 1:34:08 Metric: 1

```

```

Task: MPLS
Announcement bits (1): 0-KRT
AS path: I

...

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
299776 (1 entry, 1 announced)
TSI:
KRT in-kernel 299776 /52 -> {Flood}
 *RSVP Preference: 7
 Next hop type: Flood
 Next-hop reference count: 130
 Flood nexthop branches exceed maximum
 Address: 0x8ea65d0

...

800010 (1 entry, 1 announced)
TSI:
KRT in-kernel 800010 /36 -> {vt-3/2/0.32769}
 *VPLS Preference: 7
 Next-hop reference count: 2
 Next hop: via vt-3/2/0.32769, selected
 Label operation: Pop
 State: <Active Int>
 Age: 1:31:53
 Task: Common L2 VC
 Announcement bits (1): 0-KRT
 AS path: I

vt-3/2/0.32769 (1 entry, 1 announced)
TSI:
KRT in-kernel vt-3/2/0.32769.0 /16 -> {indirect(1048574)}
 *VPLS Preference: 7
 Next-hop reference count: 2
 Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
 Label-switched-path green-r1-r3
 Label operation: Push 800012, Push 100096(top)
 Protocol next hop: 10.255.70.103
 Push 800012
 Indirect next hop: 87272e4 1048574
 State: <Active Int>
 Age: 1:31:53 Metric2: 2
 Task: Common L2 VC
 Announcement bits (2): 0-KRT 1-Common L2 VC
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0
 Indirect next hops: 1
 Protocol next hop: 10.255.70.103 Metric: 2
 Push 800012
 Indirect next hop: 87272e4 1048574
 Indirect path forwarding next hops: 1
 Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1
 10.255.70.103/32 Originating RIB: inet.3
 Metric: 2 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: 10.31.1.6 via ge-3/1/0.0

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

```

```

abcd::10:255:71:52/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Active Int>
 Local AS: 69
 Age: 1:34:07
 Task: IF
 AS path: I

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:07
 Task: IF
 AS path: I

ff02::2/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::2/128 -> {}
 *PIM Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:08
 Task: PIM Recv6
 Announcement bits (1): 0-KRT
 AS path: I

ff02::d/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::d/128 -> {}
 *PIM Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:08
 Task: PIM Recv6
 Announcement bits (1): 0-KRT
 AS path: I

ff02::16/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::16/128 -> {}
 *MLD Preference: 0
 Next-hop reference count: 18
 State: <Active NoReadvrt Int>
 Local AS: 69
 Age: 1:34:06
 Task: MLD
 Announcement bits (1): 0-KRT
 AS path: I

private.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

```

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.16385, selected
 State: <Active NoReadvrt Int>
 Age: 1:34:07
 Task: IF
 AS path: I

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

10.255.70.103:1:3:1/96 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.70.103:1
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Secondary Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 1:28:12 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 Announcement bits (1): 0-green-l2vpn
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0
 Label-base: 800008, range: 8
 Localpref: 100
 Router ID: 10.255.70.103
 Primary Routing Table bgp.l2vpn.0

10.255.71.52:1:1:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699540
 *L2VPN Preference: 170/-1
 Next-hop reference count: 5
 Protocol next hop: 10.255.71.52
 Indirect next hop: 0 -
 State: <Active Int Ext>
 Age: 1:34:03 Metric2: 1
 Task: green-l2vpn
 Announcement bits (1): 1-BGP.0.0.0.0+179
 AS path: I
 Communities: Layer2-info: encaps:VPLS, control flags:Site-Down,
 mtu: 0
 Label-base: 800016, range: 8, status-vector: 0x9F

10.255.71.52:1:5:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699528
 *L2VPN Preference: 170/-101
 Next-hop reference count: 5
 Protocol next hop: 10.255.71.52
 Indirect next hop: 0 -
 State: <Active Int Ext>
 Age: 1:34:03 Metric2: 1
 Task: green-l2vpn
 Announcement bits (1): 1-BGP.0.0.0.0+179
 AS path: I
 Communities: Layer2-info: encaps:VPLS, control flags:, mtu: 0

```

```

Label-base: 800008, range: 8, status-vector: 0x9F

...

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
TSI:
10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
 *L2CKT Preference: 7
 Next hop: via so-1/1/2.0 weight 1, selected
 Label-switched-path my-lsp
 Label operation: Push 100000[0]
 Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
 State: <Active Int>
 Local AS: 99
 Age: 10:21
 Task: l2 circuit
 Announcement bits (1): 0-LDP
 AS path: I
 VC Label 100000, MTU 1500, VLAN ID 512

55.0.0.0/24 (1 entry, 1 announced)
TSI:
KRT queued (pending) add
 55.0.0.0/24 -> {Push 300112}
 *BGP Preference: 170/-101
 Next hop type: Router
 Address: 0x925c208
 Next-hop reference count: 2
 Source: 10.0.0.9
 Next hop: 10.0.0.9 via lt-1/2/0.15, selected
 Label operation: Push 300112
 Label TTL action: prop-ttl
 State: <Active Ext>
 Local AS: 7019 Peer AS: 13979
 Age: 1w0d 23:06:56
 AIGP: 25
 Task: BGP_13979.10.0.0.9+56732
 Announcement bits (1): 0-KRT
 AS path: 13979 7018 I
 Accepted
 Route Label: 300112
 Localpref: 100
 Router ID: 10.9.9.1

```

### show route extensive (Access Route)

```

user@host> show route 13.160.0.102 extensive
inet.0: 39256 destinations, 39258 routes (39255 active, 0 holddown, 1 hidden)
13.160.0.102/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 13.160.0.102/32 -> {13.160.0.2}
OSPF area : 0.0.0.0, LSA ID : 13.160.0.102, LSA type : Extern
 *Access Preference: 13
 Next-hop reference count: 78472
 Next hop: 13.160.0.2 via fe-0/0/0.0, selected
 State: <Active Int>
 Age: 12
 Task: RPD Unix Domain Server./var/run/rpd_serv.local

```

```
Announcement bits (2): 0-KRT 1-OSPFv2
AS path: I
```

### show route extensive (BGP PIC Edge)

```
user@host> show route 1.1.1.6 extensive
ed.inet.0: 6 destinations, 9 routes (6 active, 0 holddown, 0 hidden)
 1.1.1.6/32 (3 entries, 2 announced)
 State: <CalcForwarding>
 TSI:
 KRT in-kernel 1.1.1.6/32 -> {indirect(1048574), indirect(1048577)}
 Page 0 idx 0 Type 1 val 9219e30
 Nexthop: Self
 AS path: [2] 3 I
 Communities: target:2:1
 Path 1.1.1.6 from 1.1.1.4 Vector len 4. Val: 0
 ..
 #Multipath Preference: 255
 Next hop type: Indirect
 Address: 0x93f4010
 Next-hop reference count: 2
 ..
 Protocol next hop: 1.1.1.4
 Push 299824
 Indirect next hop: 944c000 1048574 INH Session ID: 0x3
 Indirect next hop: weight 0x1
 Protocol next hop: 1.1.1.5
 Push 299824
 Indirect next hop: 944c1d8 1048577 INH Session ID: 0x4
 Indirect next hop: weight 0x4000
 State: <ForwardingOnly Int Ext>
 Inactive reason: Forwarding use only
 Age: 25 Metric2: 15
 Validation State: unverified
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: 3 I
 Communities: target:2:1
```

### show route extensive (FRR and LFA)

```
user@host> show route 20.31.2.0 extensive
inet.0: 46 destinations, 49 routes (45 active, 0 holddown, 1 hidden)
 20.31.2.0/24 (2 entries, 1 announced)
 State: FlashAll
 TSI:
 KRT in-kernel 20.31.2.0/24 -> {Push 299776, Push 299792}
 *RSVP Preference: 7/1
 Next hop type: Router, Next hop index: 1048574
 Address: 0xbbbc010
 Next-hop reference count: 5
 Next hop: 10.31.1.2 via ge-2/1/8.0 weight 0x1, selected
 Label-switched-path europa-d-to-europa-e
 Label operation: Push 299776
 Label TTL action: prop-ttl
 Session Id: 0x201
 Next hop: 10.31.2.2 via ge-2/1/4.0 weight 0x4001
 Label-switched-path europa-d-to-europa-e
 Label operation: Push 299792
 Label TTL action: prop-ttl
 Session Id: 0x202
```



```

State: Active Int
Local AS: 100
Age: 5:31 Metric: 2
Task: RSVP
Announcement bits (1): 0-KRT
AS path: I
OSPF Preference: 10
Next hop type: Router, Next hop index: 615
Address: 0xb9d78c4
Next-hop reference count: 7
Next hop: 10.31.1.2 via ge-2/1/8.0, selected
Session Id: 0x201
State: Int
Inactive reason: Route Preference
Local AS: 100
Age: 5:35 Metric: 3
Area: 0.0.0.0
Task: OSPF
AS path: I

```

#### show route extensive (Route Reflector)

```

user@host> show route extensive
1.0.0.0/8 (1 entry, 1 announced)

TSI:
KRT in-kernel 1.0.0.0/8 -> {indirect(40)}
*BGP Preference: 170/-101
Source: 192.168.4.214
Protocol next hop: 207.17.136.192 Indirect next hop: 84ac908 40
State: <Active Int Ext>
Local AS: 10458 Peer AS: 10458
Age: 3:09 Metric: 0 Metric2: 0
Task: BGP_10458.192.168.4.214+1033
Announcement bits (2): 0-KRT 4-Resolve inet.0
AS path: 3944 7777 I <Originator>
Cluster list: 1.1.1.1
Originator ID: 10.255.245.88
Communities: 7777:7777
Localpref: 100
Router ID: 4.4.4.4
Indirect next hops: 1
 Protocol next hop: 207.17.136.192 Metric: 0
 Indirect next hop: 84ac908 40
 Indirect path forwarding next hops: 0
 Next hop type: Discard

```

#### show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show route label 299872 detail
mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
*LDP Preference: 9
Next hop type: Flood
Next-hop reference count: 3
Address: 0x9097d90
Next hop: via vt-0/1/0.1
Next-hop index: 661
Label operation: Pop
Address: 0x9172130
Next hop: via so-0/0/3.0

```

```

Next-hop index: 654
Label operation: Swap 299872
State: **Active Int>
Local AS: 1001
Age: 8:20 Metric: 1
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
FECs bound to route: P2MP root-addr 10.255.72.166, grp 232.1.1.1,
src 192.168.142.2

```

### show route label detail (Multipoint LDP with Multicast-Only Fast Reroute)

```
user@host> show route label 301568 detail
```

```

mpls.0: 18 destinations, 18 routes (18 active, 0 holddown, 0 hidden)
301568 (1 entry, 1 announced)
 *LDP Preference: 9
 Next hop type: Flood
 Address: 0x2735208
 Next-hop reference count: 3
 Next hop type: Router, Next hop index: 1397
 Address: 0x2735d2c
 Next-hop reference count: 3
 Next hop: 1.3.8.2 via ge-1/2/22.0
 Label operation: Pop
 Load balance label: None;
 Next hop type: Router, Next hop index: 1395
 Address: 0x2736290
 Next-hop reference count: 3
 Next hop: 1.3.4.2 via ge-1/2/18.0
 Label operation: Pop
 Load balance label: None;
 State: <Active Int AckRequest MulticastRPF>
 Local AS: 10
 Age: 54:05 Metric: 1
 Validation State: unverified
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 FECs bound to route: P2MP root-addr 1.1.1.1, grp: 232.1.1.1, src:
192.168.219.11
 Primary Upstream : 1.1.1.3:0--1.1.1.2:0
 RPF Nexthops :
 ge-1/2/15.0, 1.2.94.1, Label: 301568, weight: 0x1
 ge-1/2/14.0, 1.2.3.1, Label: 301568, weight: 0x1
 Backup Upstream : 1.1.1.3:0--1.1.1.6:0
 RPF Nexthops :
 ge-1/2/20.0, 1.2.96.1, Label: 301584, weight: 0xffffe
 ge-1/2/19.0, 1.3.6.1, Label: 301584, weight: 0xffffe

```

## show route flow validation

**List of Syntax** [Syntax on page 1929](#)  
[Syntax \(EX Series Switches\) on page 1929](#)

**Syntax** show route flow validation  
 <brief | detail>  
 <ip-prefix>  
 <table *table-name*>  
 <logical-system (all | *logical-system-name*)>

**Syntax (EX Series Switches)** show route flow validation  
 <brief | detail>  
 <ip-prefix>  
 <table *table-name*>

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.

**Description** Display flow route information.

**Options** **none**—Display flow route information.

**brief | detail**—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.

**ip-prefix**—(Optional) IP address for the flow route.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**table *table-name***—(Optional) Display flow route information for all routing tables whose name begins with this string (for example, inet.0 and inet6.0 are both displayed when you run the **show route flow validation inet** command).

**Required Privilege Level** view

**List of Sample Output** [show route flow validation on page 1930](#)

**Output Fields** [Table 190 on page 1929](#) lists the output fields for the **show route flow validation** command. Output fields are listed in the approximate order in which they appear.

**Table 190: show route flow validation Output Fields**

| Field Name                | Field Description                                | Level of Output |
|---------------------------|--------------------------------------------------|-----------------|
| <i>routing-table-name</i> | Name of the routing table (for example, inet.0). | All levels      |
| <i>prefix</i>             | Route address.                                   | All levels      |
| Active unicast route      | Active route in the routing table.               | All levels      |

Table 190: show route flow validation Output Fields (*continued*)

| Field Name                  | Field Description                                                       | Level of Output |
|-----------------------------|-------------------------------------------------------------------------|-----------------|
| Dependent flow destinations | Number of flows for which there are routes in the routing table.        | All levels      |
| Origin                      | Source of the route flow.                                               | All levels      |
| Neighbor AS                 | Autonomous system identifier of the neighbor.                           | All levels      |
| Flow destination            | Number of entries and number of destinations that match the route flow. | All levels      |
| Unicast best match          | Destination that is the best match for the route flow.                  | All levels      |
| Flags                       | Information about the route flow.                                       | All levels      |

## Sample Output

### show route flow validation

```
user@host> show route flow validation
inet.0:
10.0.5.0/24Active unicast route
Dependent flow destinations: 1
Origin: 192.168.224.218, Neighbor AS: 65001
Flow destination (3 entries, 1 match origin)
Unicast best match: 10.0.5.0/24
Flags: SubtreeApex Consistent
```

## show route forwarding-table

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                                | <a href="#">Syntax on page 1931</a><br><a href="#">Syntax (MX Series Routers) on page 1931</a><br><a href="#">Syntax (TX Matrix and TX Matrix Plus Routers) on page 1931</a>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                        | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;label name&gt; &lt;matching matching&gt; &lt;multicast&gt; &lt;table (default   logical-system-name/routing-instance-name   routing-instance-name)&gt; &lt;vlan (all   vlan-name)&gt; &lt;vpn vpn&gt;</pre>                                                                                     |
| <b>Syntax (MX Series Routers)</b>                    | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;bridge-domain (all   domain-name)&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;label name&gt; &lt;learning-vlan-id learning-vlan-id&gt; &lt;matching matching&gt; &lt;multicast&gt; &lt;table (default   logical-system-name/routing-instance-name   routing-instance-name)&gt; &lt;vlan (all   vlan-name)&gt; &lt;vpn vpn&gt;</pre> |
| <b>Syntax (TX Matrix and TX Matrix Plus Routers)</b> | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;matching matching&gt; &lt;label name&gt; &lt;lcc number&gt; &lt;multicast&gt; &lt;table routing-instance-name&gt; &lt;vpn vpn&gt;</pre>                                                                                                                                                         |
| <b>Release Information</b>                           | <p>Command introduced before Junos OS Release 7.4.</p> <p>Option <b>bridge-domain</b> introduced in Junos OS Release 7.5</p> <p>Option <b>learning-vlan-id</b> introduced in Junos OS Release 8.4</p>                                                                                                                                                                                                                                                                                                                                   |

Options **all** and **vlan** introduced in Junos OS Release 9.6.

Command introduced in Junos OS Release 11.3 for the QFX Series.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Display the Routing Engine's forwarding table, including the network-layer prefixes and their next hops. This command is used to help verify that the routing protocol process has relayed the correction information to the forwarding table. The Routing Engine constructs and maintains one or more routing tables. From the routing tables, the Routing Engine derives a table of active routes, called the forwarding table.



**NOTE:** The Routing Engine copies the forwarding table to the Packet Forwarding Engine, the part of the router that is responsible for forwarding packets. To display the entries in the Packet Forwarding Engine's forwarding table, use the **show pfe route** command.

**Options** **none**—Display the routes in the forwarding tables. By default, the **show route forwarding-table** command does not display information about private, or internal, forwarding tables.

**detail | extensive | summary**—(Optional) Display the specified level of output.

**all**—(Optional) Display routing table entries for all forwarding tables, including private, or internal, tables.

**bridge-domain (all | bridge-domain-name)**—(MX Series routers only) (Optional) Display route entries for all bridge domains or the specified bridge domain.

**ccc interface-name**—(Optional) Display route entries for the specified circuit cross-connect interface.

**destination destination-prefix**—(Optional) Destination prefix.

**family family**—(Optional) Display routing table entries for the specified family: **fibre-channel**, **fmembers**, **inet**, **inet6**, **iso**, **mpls**, **tnp**, **unix**, **vpls**, or **vlan-classification**.

**interface-name interface-name**—(Optional) Display routing table entries for the specified interface.

**label name**—(Optional) Display route entries for the specified label.

**lcc number**—(TX Matrix and TX matrix Plus routers only) (Optional) On a routing matrix composed of a TX Matrix router and T640 routers, display information for the specified T640 router (or line-card chassis) connected to the TX Matrix router. On a routing matrix composed of the TX Matrix Plus router and T1600 or T4000 routers, display information for the specified router (line-card chassis) connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**learning-vlan-id** *learning-vlan-id*—(MX Series routers only) (Optional) Display learned information for all VLANs or for the specified VLAN.

**matching** *matching*—(Optional) Display routing table entries matching the specified prefix or prefix length.

**multicast**—(Optional) Display routing table entries for multicast routes.

**table** (**default** | *logical-system-name/routing-instance-name* | *routing-instance-name*)—(Optional) Display route entries for all the routing tables in the main routing instance or for the specified routing instance. If your device supports logical systems, you can also display route entries for the specified logical system and routing instance. To view the routing instances on your device, use the [show route instance](#) command.

**vlan** (**all** | *vlan-name*)—(Optional) Display information for all VLANs or for the specified VLAN.

**vpn** *vpn*—(Optional) Display routing table entries for a specified VPN.

**Required Privilege Level**

view

**List of Sample Output**

[show route forwarding-table on page 1936](#)  
[show route forwarding-table detail on page 1937](#)  
[show route forwarding-table destination extensive \(Weights and Balances\) on page 1937](#)  
[show route forwarding-table extensive on page 1938](#)  
[show route forwarding-table extensive \(RPF\) on page 1939](#)  
[show route forwarding-table family mpls on page 1940](#)  
[show route forwarding-table family vpls on page 1940](#)  
[show route forwarding-table vpls \(Broadcast, unknown unicast, and multicast \(BUM\) hashing is enabled\) on page 1940](#)  
[show route forwarding-table vpls \(Broadcast, unknown unicast, and multicast \(BUM\) hashing is enabled with MAC Statistics\) on page 1941](#)  
[show route forwarding-table family vpls extensive on page 1941](#)  
[show route forwarding-table table default on page 1942](#)  
[show route forwarding-table table logical-system-name/routing-instance-name on page 1943](#)

[show route forwarding-table vpn on page 1944](#)

**Output Fields** [Table 191 on page 1934](#) lists the output fields for the **show route forwarding-table** command. Output fields are listed in the approximate order in which they appear. Field names might be abbreviated (as shown in parentheses) when no level of output is specified, or when the **detail** keyword is used instead of the **extensive** keyword.

**Table 191: show route forwarding-table Output Fields**

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output         |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Logical system          | Name of the logical system. This field is displayed if you specify the <b>table logical-system-name/routing-instance-name</b> option on a device that is configured for and supports logical systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels              |
| Routing table           | Name of the routing table (for example, inet, inet6, mpls).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels              |
| Address family          | Address family (for example, IP, IPv6, ISO, MPLS, and VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels              |
| Destination             | Destination of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| Route Type (Type)       | How the route was placed into the forwarding table. When the <b>detail</b> keyword is used, the route type might be abbreviated (as shown in parentheses): <ul style="list-style-type: none"> <li><b>cloned (clon)</b>—(TCP or multicast only) Cloned route.</li> <li><b>destination (dest)</b>—Remote addresses directly reachable through an interface.</li> <li><b>destination down (iddn)</b>—Destination route for which the interface is unreachable.</li> <li><b>interface cloned (ifcl)</b>—Cloned route for which the interface is unreachable.</li> <li><b>route down (ifdn)</b>—Interface route for which the interface is unreachable.</li> <li><b>ignore (ignr)</b>—Ignore this route.</li> <li><b>interface (intf)</b>—Installed as a result of configuring an interface.</li> <li><b>permanent (perm)</b>—Routes installed by the kernel when the routing table is initialized.</li> <li><b>user</b>—Routes installed by the routing protocol process or as a result of the configuration.</li> </ul> | All levels              |
| Route Reference (RtRef) | Number of routes to reference.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| Flags                   | Route type flags: <ul style="list-style-type: none"> <li><b>none</b>—No flags are enabled.</li> <li><b>accounting</b>—Route has accounting enabled.</li> <li><b>cached</b>—Cache route.</li> <li><b>incoming-iface interface-number</b>—Check against incoming interface.</li> <li><b>prefix load balance</b>—Load balancing is enabled for this prefix.</li> <li><b>rt nh decoupled</b>—Route has been decoupled from the next hop to the destination.</li> <li><b>sent to PFE</b>—Route has been sent to the Packet Forwarding Engine.</li> <li><b>static</b>—Static route.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>        |
| Next hop                | IP address of the next hop to the destination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |



Table 191: show route forwarding-table Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Next hop Type (Type)       | <p>Next-hop type. When the <b>detail</b> keyword is used, the next-hop type might be abbreviated (as indicated in parentheses):</p> <ul style="list-style-type: none"> <li>• <b>broadcast (bcst)</b>—Broadcast.</li> <li>• <b>deny</b>—Deny.</li> <li>• <b>discard (dscd)</b> —Discard.</li> <li>• <b>hold</b>—Next hop is waiting to be resolved into a unicast or multicast type.</li> <li>• <b>indexed (idxd)</b>—Indexed next hop.</li> <li>• <b>indirect (indr)</b>—Indirect next hop.</li> <li>• <b>local (locl)</b>—Local address on an interface.</li> <li>• <b>routed multicast (mcrst)</b>—Regular multicast next hop.</li> <li>• <b>multicast (mcst)</b>—Wire multicast next hop (limited to the LAN).</li> <li>• <b>multicast discard (mdsc)</b>—Multicast discard.</li> <li>• <b>multicast group (mgrp)</b>—Multicast group member.</li> <li>• <b>receive (rcv)</b>—Receive.</li> <li>• <b>reject (rjct)</b>—Discard. An ICMP unreachable message was sent.</li> <li>• <b>resolve (rslv)</b>—Resolving the next hop.</li> <li>• <b>unicast (ucst)</b>—Unicast.</li> <li>• <b>unilist (ulst)</b>—List of unicast next hops. A packet sent to this next hop goes to any next hop in the list.</li> </ul> | <b>detail extensive</b>      |
| Index                      | Software index of the next hop that is used to route the traffic for a given prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| Route interface-index      | Logical interface index from which the route is learned. For example, for interface routes, this is the logical interface index of the route itself. For static routes, this field is zero. For routes learned through routing protocols, this is the logical interface index from which the route is learned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b>             |
| Reference (NhRef)          | Number of routes that refer to this next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| Next-hop interface (Netif) | Interface used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| Weight                     | Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible (see the <b>Balance</b> field description).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>             |
| Balance                    | Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a router is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b>             |
| RPF interface              | List of interfaces from which the prefix can be accepted. Reverse path forwarding (RPF) information is displayed only when <b>rpf-check</b> is configured on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>             |

## Sample Output

## show route forwarding-table

```

user@host> show route forwarding-table
Routing table: default.inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 46 4
0.0.0.0/32 perm 0 dscd 44 1
1.1.1.0/24 ifdn 0 rslv 608 1 ge-2/0/1.0
1.1.1.0/32 iddn 0 1.1.1.0 recv 606 1 ge-2/0/1.0
1.1.1.1/32 user 0 rjct 46 4
1.1.1.1/32 intf 0 1.1.1.1 locl 607 2
1.1.1.1/32 iddn 0 1.1.1.1 locl 607 2
1.1.1.255/32 iddn 0 ff:ff:ff:ff:ff:ff bcst 605 1 ge-2/0/1.0
10.0.0.0/24 intf 0 rslv 616 1 ge-2/0/0.0
10.0.0.0/32 dest 0 10.0.0.0 recv 614 1 ge-2/0/0.0
10.0.0.1/32 intf 0 10.0.0.1 locl 615 2
10.0.0.1/32 dest 0 10.0.0.1 locl 615 2
10.0.0.255/32 dest 0 10.0.0.255 bcst 613 1 ge-2/0/0.0
10.1.1.0/24 ifdn 0 rslv 612 1 ge-2/0/1.0
10.1.1.0/32 iddn 0 10.1.1.0 recv 610 1 ge-2/0/1.0
10.1.1.1/32 user 0 rjct 46 4
10.1.1.1/32 intf 0 10.1.1.1 locl 611 2
10.1.1.1/32 iddn 0 10.1.1.1 locl 611 2
10.1.1.255/32 iddn 0 ff:ff:ff:ff:ff:ff bcst 609 1 ge-2/0/1.0
10.209.0.0/16 user 0 10.209.63.254 ucst 419 20 fxp0.0
10.209.0.0/16 user 1 0:12:1e:ca:98:0 ucst 419 20 fxp0.0
10.209.0.0/18 intf 0 rslv 418 1 fxp0.0
10.209.0.0/32 dest 0 10.209.0.0 recv 416 1 fxp0.0
10.209.2.131/32 intf 0 10.209.2.131 locl 417 2
10.209.2.131/32 dest 0 10.209.2.131 locl 417 2
10.209.17.55/32 dest 0 0:30:48:5b:78:d2 ucst 435 1 fxp0.0
10.209.63.42/32 dest 0 0:23:7d:58:92:ca ucst 434 1 fxp0.0
10.209.63.254/32 dest 0 0:12:1e:ca:98:0 ucst 419 20 fxp0.0
10.209.63.255/32 dest 0 10.209.63.255 bcst 415 1 fxp0.0
10.227.0.0/16 user 0 10.209.63.254 ucst 419 20 fxp0.0

...

Routing table: iso
ISO:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 27 1
47.0005.80ff.f800.0000.0108.0003.0102.5524.5220.00
intf 0 locl 28 1

Routing table: inet6
Internet6:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 6 1
ff00::/8 perm 0 mdsc 4 1
ff02::1/128 perm 0 ff02::1 mcst 3 1

Routing table: ccc
MPLS:
Interface.Label Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 16 1
100004(top)fe-0/0/1.0

```

## show route forwarding-table detail

```

user@host> show route forwarding-table detail
Routing table: inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
default user 2 0:90:69:8e:b1:1b ucst 132 4 fxp0.0
default perm 0 rjct 14 1
10.1.1.0/24 intf 0 ff.3.0.21 ucst 322 1 so-5/3/0.0
10.1.1.0/32 dest 0 10.1.1.0 recv 324 1 so-5/3/0.0
10.1.1.1/32 intf 0 10.1.1.1 locl 321 1
10.1.1.255/32 dest 0 10.1.1.255 bcst 323 1 so-5/3/0.0
10.21.21.0/24 intf 0 ff.3.0.21 ucst 326 1 so-5/3/0.0
10.21.21.0/32 dest 0 10.21.21.0 recv 328 1 so-5/3/0.0
10.21.21.1/32 intf 0 10.21.21.1 locl 325 1
10.21.21.255/32 dest 0 10.21.21.255 bcst 327 1 so-5/3/0.0
127.0.0.1/32 intf 0 127.0.0.1 locl 320 1
172.17.28.19/32 clon 1 192.168.4.254 ucst 132 4 fxp0.0
172.17.28.44/32 clon 1 192.168.4.254 ucst 132 4 fxp0.0

...

Routing table: private1__inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 46 1
10.0.0.0/8 intf 0 rslv 136 1 fxp1.0
10.0.0.0/32 dest 0 10.0.0.0 recv 134 1 fxp1.0
10.0.0.4/32 intf 0 10.0.0.4 locl 135 2
10.0.0.4/32 dest 0 10.0.0.4 locl 135 2

...

Routing table: iso
ISO:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 38 1

Routing table: inet6
Internet6:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 22 1
ff00::/8 perm 0 mdsc 21 1
ff02::1/128 perm 0 ff02::1 mcst 17 1

...

Routing table: mpls
MPLS:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 28 1

```

## show route forwarding-table destination extensive (Weights and Balances)

```

user@host> show route forwarding-table destination 3.4.2.1 extensive
Routing table: inet [Index 0]
Internet:

Destination: 3.4.2.1/32
Route type: user
Route reference: 0 Route interface-index: 0

```

```

Flags: sent to PFE
Next-hop type: unilist Index: 262143 Reference: 1
Nexthop: 4.4.4.4
Next-hop type: unicast Index: 335 Reference: 2
Next-hop interface: so-1/1/0.0 Weight: 22 Balance: 3
Nexthop: 145.12.1.2
Next-hop type: unicast Index: 337 Reference: 2
Next-hop interface: so-0/1/2.0 Weight: 33 Balance: 33

```

### show route forwarding-table extensive

```

user@host> show route forwarding-table extensive
Routing table: inet [Index 0]
Internet:

Destination: default
Route type: user
Route reference: 2 Route interface-index: 0
Flags: sent to PFE
Nexthop: 0:90:69:8e:b1:1b
Next-hop type: unicast Index: 132 Reference: 4
Next-hop interface: fxp0.0

Destination: default
Route type: permanent
Route reference: 0 Route interface-index: 0
Flags: none
Next-hop type: reject Index: 14 Reference: 1

Destination: 127.0.0.1/32
Route type: interface
Route reference: 0 Route interface-index: 0
Flags: sent to PFE
Nexthop: 127.0.0.1
Next-hop type: local Index: 320 Reference: 1

...

Routing table: private1__inet [Index 1]
Internet:

Destination: default
Route type: permanent
Route reference: 0 Route interface-index: 0
Flags: sent to PFE
Next-hop type: reject Index: 46 Reference: 1

Destination: 10.0.0.0/8
Route type: interface
Route reference: 0 Route interface-index: 3
Flags: sent to PFE
Next-hop type: resolve Index: 136 Reference: 1
Next-hop interface: fxp1.0

...

Routing table: iso [Index 0]
ISO:

Destination: default
Route type: permanent

```

```

Route reference: 0
Flags: sent to PFE
Next-hop type: reject
Route interface-index: 0
Index: 38 Reference: 1

Routing table: inet6 [Index 0]
Internet6:

Destination: default
Route type: permanent
Route reference: 0
Flags: sent to PFE
Next-hop type: reject
Route interface-index: 0
Index: 22 Reference: 1

Destination: ff00::/8
Route type: permanent
Route reference: 0
Flags: sent to PFE
Next-hop type: multicast discard
Route interface-index: 0
Index: 21 Reference: 1

...

Routing table: private1__inet6 [Index 1]
Internet6:

Destination: default
Route type: permanent
Route reference: 0
Flags: sent to PFE
Next-hop type: reject
Route interface-index: 0
Index: 54 Reference: 1

Destination: fe80::2a0:a5ff:fe3d:375/128
Route type: interface
Route reference: 0
Flags: sent to PFE
Next-hop: fe80::2a0:a5ff:fe3d:375
Next-hop type: local
Route interface-index: 0
Index: 75 Reference: 1

...

```

### show route forwarding-table extensive (RPF)

The next example is based on the following configuration, which enables an RPF check on all routes that are learned from this interface, including the interface route:

```

so-1/1/0 {
 unit 0 {
 family inet {
 rpf-check;
 address 15.95.1.2/30;
 }
 }
}

```

```

user@host> show route forwarding-table extensive
Routing table: inet [Index 0]
Internet:
...
...
Destination: 15.95.1.3/32
Route type: destination
Route reference: 0
Route interface-index: 67

```

```

Flags: sent to PFE
Nexthop: 15.95.1.3
Next-hop type: broadcast Index: 328 Reference: 1
Next-hop interface: so-1/1/0.0
RPF interface: so-1/1/0.0

```

#### show route forwarding-table family mpls

```

user@host> show route forwarding-table family mpls
Routing table: mpls
MPLS:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0
0 user 0
1 user 0
2 user 0
100000 user 0 10.31.1.6 swap 100001 fe-1/1/0.0
800002 user 0 Pop vt-0/3/0.32770

vt-0/3/0.32770 (VPLS)
 user 0 indr 351 4
 Push 800000, Push 100002(top)

so-0/0/0.0

```

#### show route forwarding-table family vpls

```

user@host> show route forwarding-table family vpls
Routing table: green.vpls
VPLS:
Destination Type RtRef Next hop Type Index NhRef Netif
default dymn 0
default perm 0
fe-0/1/0.0 dymn 0
00:90:69:0c:20:1f/48 <<<<<Remote CE

 dymn 0 indr 351 4
 Push 800000, Push 100002(top)

so-0/0/0.0
00:90:69:85:b0:1f/48 <<<<<Local CE

 dymn 0 ucst 354 2 fe-0/1/0.0

```

#### show route forwarding-table vpls (Broadcast, unknown unicast, and multicast (BUM) hashing is enabled)

```

user@host> show route forwarding-table vpls
Routing table: green.vpls
VPLS:
Enabled protocols: BUM hashing
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0
lsi.1048832 intf 0
 4.4.3.2 Push 262145 621 2

ge-3/0/0.0
00:19:e2:25:d0:01/48 user 0 ucst 590 5 ge-2/3/9.0
0x30003/51 user 0 comp 627 2
ge-2/3/9.0 intf 0 ucst 590 5 ge-2/3/9.0
ge-3/1/3.0 intf 0 ucst 619 4 ge-3/1/3.0
0x30002/51 user 0 comp 600 2
0x30001/51 user 0 comp 597 2

```

### show route forwarding-table vpls (Broadcast, unknown unicast, and multicast (BUM) hashing is enabled with MAC Statistics)

```

user@host> show route forwarding-table vpls
Routing table: green.vpls
VPLS:
Enabled protocols: BUM hashing, MAC Stats

```

| Destination          | Type | RtRef | Next hop | Type | Index   | NhRef | Netif      |
|----------------------|------|-------|----------|------|---------|-------|------------|
| default              | perm | 0     |          | dscd | 519     | 1     |            |
| 1si.1048834          | intf | 0     |          | indr | 1048574 | 4     |            |
|                      |      |       | 4.4.3.2  | Push | 262145  | 592   | 2          |
| ge-3/0/0.0           |      |       |          |      |         |       |            |
| 00:19:e2:25:d0:01/48 | user | 0     |          | ucst | 590     | 5     | ge-2/3/9.0 |
| 0x30003/51           | user | 0     |          | comp | 630     | 2     |            |
| ge-2/3/9.0           | intf | 0     |          | ucst | 590     | 5     | ge-2/3/9.0 |
| ge-3/1/3.0           | intf | 0     |          | ucst | 591     | 4     | ge-3/1/3.0 |
| 0x30002/51           | user | 0     |          | comp | 627     | 2     |            |
| 0x30001/51           | user | 0     |          | comp | 624     | 2     |            |

### show route forwarding-table family vpls extensive

```

user@host> show route forwarding-table family vpls extensive
Routing table: green.vpls [Index 2]
VPLS:

```

Destination: default

|                                |                              |
|--------------------------------|------------------------------|
| Route type: dynamic            | Route interface-index: 72    |
| Route reference: 0             |                              |
| Flags: sent to PFE             |                              |
| Next-hop type: flood           | Index: 289      Reference: 1 |
| Next-hop type: unicast         | Index: 291      Reference: 3 |
| Next-hop interface: fe-0/1/3.0 |                              |
| Next-hop type: unicast         | Index: 290      Reference: 3 |
| Next-hop interface: fe-0/1/2.0 |                              |

Destination: default

|                        |                              |
|------------------------|------------------------------|
| Route type: permanent  | Route interface-index: 0     |
| Route reference: 0     |                              |
| Flags: none            |                              |
| Next-hop type: discard | Index: 341      Reference: 1 |

Destination: fe-0/1/2.0

|                                |                              |
|--------------------------------|------------------------------|
| Route type: dynamic            | Route interface-index: 69    |
| Route reference: 0             |                              |
| Flags: sent to PFE             |                              |
| Next-hop type: flood           | Index: 293      Reference: 1 |
| Next-hop type: indirect        | Index: 363      Reference: 4 |
| Next-hop type: Push 800016     |                              |
| Next-hop interface: at-1/0/1.0 |                              |
| Next-hop type: indirect        | Index: 301      Reference: 5 |
| Next hop: 10.31.3.2            |                              |
| Next-hop type: Push 800000     |                              |
| Next-hop interface: fe-0/1/1.0 |                              |
| Next-hop type: unicast         | Index: 291      Reference: 3 |
| Next-hop interface: fe-0/1/3.0 |                              |

Destination: fe-0/1/3.0

|                      |                              |
|----------------------|------------------------------|
| Route type: dynamic  | Route interface-index: 70    |
| Route reference: 0   |                              |
| Flags: sent to PFE   |                              |
| Next-hop type: flood | Index: 292      Reference: 1 |

```

Next-hop type: indirect Index: 363 Reference: 4
Next-hop type: Push 800016
Next-hop interface: at-1/0/1.0
Next-hop type: indirect Index: 301 Reference: 5
Next hop: 10.31.3.2
Next-hop type: Push 800000
Next-hop interface: fe-0/1/1.0
Next-hop type: unicast Index: 290 Reference: 3
Next-hop interface: fe-0/1/2.0

Destination: 10:00:00:01:01:01/48
Route type: dynamic
Route reference: 0 Route interface-index: 70
Flags: sent to PFE, prefix load balance
Next-hop type: unicast Index: 291 Reference: 3
Next-hop interface: fe-0/1/3.0
Route used as destination:
 Packet count: 6640 Byte count: 675786
Route used as source
 Packet count: 6894 Byte count: 696424

Destination: 10:00:00:01:01:04/48
Route type: dynamic
Route reference: 0 Route interface-index: 69
Flags: sent to PFE, prefix load balance
Next-hop type: unicast Index: 290 Reference: 3
Next-hop interface: fe-0/1/2.0
Route used as destination:
 Packet count: 96 Byte count: 8079
Route used as source:
 Packet count: 296 Byte count: 24955

Destination: 10:00:00:01:03:05/48
Route type: dynamic
Route reference: 0 Route interface-index: 74
Flags: sent to PFE, prefix load balance
Next-hop type: indirect Index: 301 Reference: 5
Next hop: 10.31.3.2
Next-hop type: Push 800000
Next-hop interface: fe-0/1/1.0

```

#### show route forwarding-table table default

```

user@host> show route forwarding-table table default
Routing table: default.inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0
0.0.0.0/32 perm 0
10.0.60.0/30 user 0 10.0.60.13 ucst 713 5 fe-0/1/3.0
10.0.60.12/30 intf 0
10.0.60.12/32 dest 0 10.0.60.12 recv 686 1 fe-0/1/3.0
10.0.60.13/32 dest 0 0:5:85:8b:bc:22 ucst 713 5 fe-0/1/3.0
10.0.60.14/32 intf 0 10.0.60.14 locl 687 2
10.0.60.14/32 dest 0 10.0.60.14 locl 687 2
10.0.60.15/32 dest 0 10.0.60.15 bcst 685 1 fe-0/1/3.0
10.0.67.12/30 user 0 10.0.60.13 ucst 713 5 fe-0/1/3.0
10.0.80.0/30 ifdn 0 ff.3.0.21 ucst 676 1 so-0/0/1.0
10.0.80.0/32 dest 0 10.0.80.0 recv 678 1 so-0/0/1.0
10.0.80.2/32 user 0
10.0.80.2/32 intf 0 10.0.80.2 locl 675 1

```



```

10.0.80.3/32 dest 0 10.0.80.3 bcst 677 1 so-0/0/1.0
10.0.90.12/30 intf 0 rslv 684 1 fe-0/1/0.0
10.0.90.12/32 dest 0 10.0.90.12 recv 682 1 fe-0/1/0.0
10.0.90.14/32 intf 0 10.0.90.14 locl 683 2
10.0.90.14/32 dest 0 10.0.90.14 locl 683 2
10.0.90.15/32 dest 0 10.0.90.15 bcst 681 1 fe-0/1/0.0
10.5.0.0/16 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.10.0.0/16 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.13.10.0/23 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.84.0.0/16 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.150.0.0/16 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.157.64.0/19 user 0 192.168.187.126 ucst 324 15 fxp0.0
10.209.0.0/16 user 0 192.168.187.126 ucst 324 15 fxp0.0

```

...

Routing table: default.iso

ISO:

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | rjct | 60    | 1     |       |

Routing table: default.inet6

Internet6:

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | rjct | 44    | 1     |       |
| ::/128      | perm | 0     |          | dscd | 42    | 1     |       |
| ff00::/8    | perm | 0     |          | mdsc | 43    | 1     |       |
| ff02::1/128 | perm | 0     | ff02::1  | mcst | 39    | 1     |       |

Routing table: default.mpls

MPLS:

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | dscd | 50    | 1     |       |

### show route forwarding-table table logical-system-name/routing-instance-name

```
user@host> show route forwarding-table table R4/vpn-red
```

Logical system: R4

Routing table: vpn-red.inet

Internet:

| Destination        | Type | RtRef | Next hop                                       | Type | Index | NhRef | Netif      |
|--------------------|------|-------|------------------------------------------------|------|-------|-------|------------|
| default            | perm | 0     |                                                | rjct | 563   | 1     |            |
| 0.0.0.0/32         | perm | 0     |                                                | dscd | 561   | 2     |            |
| 1.0.0.1/32         | user | 0     |                                                | dscd | 561   | 2     |            |
| 2.0.2.0/24         | intf | 0     |                                                | rslv | 771   | 1     | ge-1/2/0.3 |
| 2.0.2.0/32         | dest | 0     | 2.0.2.0                                        | recv | 769   | 1     | ge-1/2/0.3 |
| 2.0.2.1/32         | intf | 0     | 2.0.2.1                                        | locl | 770   | 2     |            |
| 2.0.2.1/32         | dest | 0     | 2.0.2.1                                        | locl | 770   | 2     |            |
| 2.0.2.2/32         | dest | 0     | 0.4.80.3.0.1b.c0.d5.e4.bd.0.1b.c0.d5.e4.bc.8.0 | ucst | 789   | 1     | ge-1/2/0.3 |
| 2.0.2.255/32       | dest | 0     | 2.0.2.255                                      | bcst | 768   | 1     | ge-1/2/0.3 |
| 224.0.0.0/4        | perm | 1     |                                                | mdsc | 562   | 1     |            |
| 224.0.0.1/32       | perm | 0     | 224.0.0.1                                      | mcst | 558   | 1     |            |
| 255.255.255.255/32 | perm | 0     |                                                | bcst | 559   | 1     |            |

Logical system: R4

Routing table: vpn-red.iso

ISO:

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | rjct | 608   | 1     |       |

```

Logical system: R4
Routing table: vpn-red.inet6
Internet6:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 rjct 708 1
::/128 perm 0 dscd 706 1
ff00::/8 perm 0 mdsc 707 1
ff02::1/128 perm 0 ff02::1 mcst 704 1

```

```

Logical system: R4
Routing table: vpn-red.mpls
MPLS:
Destination Type RtRef Next hop Type Index NhRef Netif
default perm 0 dscd 638

```

### show route forwarding-table vpn

```

user@host> show route forwarding-table vpn VPN-A
Routing table:: VPN-A.inet
Internet:
Destination Type RtRef Nexthop Type Index NhRef Netif
default perm 0 rjct 4 4
10.39.10.20/30 intf 0 ff.3.0.21 ucst 40 1
so-0/0/0.0
10.39.10.21/32 intf 0 10.39.10.21 locl 36 1
10.255.14.172/32 user 0 ucst 69 2
so-0/0/0.0
10.255.14.175/32 user 0 indr 81 3
Push 100004, Push
100004(top) so-1/0/0.0
224.0.0.0/4 perm 2 mdsc 5 3
224.0.0.1/32 perm 0 224.0.0.1 mcst 1 8
224.0.0.5/32 user 1 224.0.0.5 mcst 1 8
255.255.255.255/32 perm 0 bcst 2 3

```

## show route forwarding-table interface-name

|                                 |                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route forwarding-table interface-name <i>interface-name</i><br><detail   extensive><br><all>                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.6.                                                                                                                                                                                                           |
| <b>Description</b>              | Display the interfaces in the Routing Engine's forwarding table.                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Display information for the specified interface.</p> <p><b>detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>all</b>—(Optional) Display all interfaces in the routing table.</p>                      |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show route forwarding-table interface-name fe-0/1/1 on page 1946</a><br><a href="#">show route forwarding-table interface-name all on page 1946</a><br><a href="#">show route forwarding-table interface-name all detail on page 1947</a> |
| <b>Output Fields</b>            | Table 192 on page 1945 lists the output fields for the <b>show route forwarding-table interface-name</b> command. Output fields are listed in the approximate order in which they appear.                                                             |

Table 192: show route forwarding-table interface-name Output Fields

| Field Name     | Field Description                                                                                                                                                                                                                             | Level of Output         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Name</b>    | Name of the interface (for example <b>fe-0/1/1</b> , <b>lo0</b> , <b>ae0</b> , and so on).                                                                                                                                                    | All levels              |
| <b>MTU</b>     | Interface's maximum transmission unit (MTU).                                                                                                                                                                                                  | All levels              |
| <b>Afam</b>    | Configured address family (for example <b>inet</b> , <b>tnp</b> , <b>inet6</b> , and so on).                                                                                                                                                  | <b>detail extensive</b> |
| <b>Network</b> | Network information: <ul style="list-style-type: none"> <li>• <b>&lt;Link&gt;</b>—Physical interface, not a logical interface.</li> <li>• <b>&lt;PtoP&gt;</b>—Point-to-point network.</li> <li>• <b>ipaddress</b>—Network address.</li> </ul> | All levels              |
| <b>Address</b> | Address of the interface. The address can be a MAC address, IPv4 address, IPv6 address, and so on.                                                                                                                                            | All levels              |
| <b>IPkts</b>   | Number of packets received on the interface.                                                                                                                                                                                                  | All levels              |
| <b>Ierr</b>    | Number of packets received on the interface with errors.                                                                                                                                                                                      | All levels              |
| <b>Opkts</b>   | Number of packets transmitted or sent from the interface.                                                                                                                                                                                     | All levels              |

Table 192: show route forwarding-table interface-name Output Fields (*continued*)

| Field Name  | Field Description                                                     | Level of Output |
|-------------|-----------------------------------------------------------------------|-----------------|
| <b>Oerr</b> | Number of packets transmitted or sent from the interface with errors. | All levels      |
| <b>Coll</b> | Number of packets that experienced collisions on the interface.       | All levels      |

## Sample Output

### show route forwarding-table interface-name fe-0/1/1

```

user@host> show route forwarding-table interface-name fe-0/1/1
Name Mtu Network Address IpKts Ierr Opkts Oerr Coll
fe-0/1/1 1514 <Link> 00.05.85.88.cc.20 0 0 0 0 0

```

### show route forwarding-table interface-name all

```

user@host> show route forwarding-table interface-name all
Name Mtu Network Address IpKts Ierr Opkts Oerr Coll
fxp0 1514 <Link> 00.a0.a5.56.03.83 180965 0 39907 0 0

 unit 0
 fxp1 1514 <Link> 02.00.00.00.00.04 33010497 0 30110800 0 0

 unit 0 1500 192.168.187.0/ 192.168.187.10
 fxp1 1514 <Link> 02.00.00.00.00.04 33010497 0 30110800 0 0

 unit 0 1500 10.0.0.0/8 10.0.0.1
 10.0.0.0/8 10.0.0.4
 128.0.0.0/2 128.0.0.1
 128.0.0.0/2 128.0.0.4
 1500 fe80::/64 fe80::200:ff:fe0
 fec0::/64 fec0::a:0:0:4
 1500 4
 lsi 1496 <Link>
 dsc max <Link> 0 0 0 0 0
 lo0 max <Link> 8980 0 8980 0 0

 unit 0 max 127.0.0.1/8 127.0.0.1
 192.168.0.1/8 192.168.0.1
 unit 16384 max 127.0.0.1/8 127.0.0.1
 unit 16385 max
 gre max <Link>
 ipip max <Link>
 tap max <Link>
 pime max <Link>
 pimd max <Link>
 mtun max <Link>
 so-0/0/0 4474 <Link> 1679900 0 1068611 0 0

 unit 0 4470 <PtoP> 10.0.60.2 0 0 0 0
 0
 so-0/0/1 4474 <Link> 0 0 0 0 0

 unit 0 4470 <PtoP> 10.0.80.2 0 0 0 0
 0
 so-0/0/2 4474 <Link> 0 0 0 0 0
 so-0/0/3 4474 <Link> 0 0 0 0 0
 fe-0/1/0 1514 <Link> 00.05.85.88.cc.1f 523120 0 623044 0 0

 unit 0 1500 10.0.90.12/30 10.0.90.14 0 0 0 0

```

```

0
fe-0/1/1 1514 <Link> 00.05.85.88.cc.20 0 0 0 0 0
fe-0/1/2 1514 <Link> 00.05.85.88.cc.21 0 0 0 0 0

```

```
...
```

### show route forwarding-table interface-name all detail

```

user@host> show route forwarding-table interface-name all detail
Name Mtu AFam Network Address Ipks Ierr Opkts
Oerr Coll
fxp0 1514 <Link> 00.a0.a5.56.03.83 181005 0 39948
0 0
unit 0 1500 inet 192.168.187.0/ 192.168.187.10
fxp1 1514 <Link> 02.00.00.00.00.04 33012676 0 30112468
0 0
unit 0 1500 inet 10.0.0.0/8 10.0.0.1
10.0.0.0/8 10.0.0.4
128.0.0.0/2 128.0.0.1
128.0.0.0/2 128.0.0.4
1500 inet6 fe80::/64 fe80::200:ff:fe0
fec0::/64 fec0::a:0:0:4
1500 tnp
1496 <Link>
dsc max <Link> 0 0 0
0 0
lo0 max <Link> 8980 0 8980
0 0
unit 0 max inet 127.0.0.1/8 127.0.0.1
192.168.0.1/8 192.168.0.1
unit 16384 max inet 127.0.0.1/8 127.0.0.1
unit 16385 max inet
gre max <Link>
ipip max <Link>
tap max <Link>
pime max <Link>
pimd max <Link>
mtun max <Link>
so-0/0/0 4474 <Link> 1679980 0 1068661
0 0
unit 0 4470 inet <PtoP> 10.0.60.2 0 0 0
0 0
...

```

## show route hidden

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route hidden<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display only hidden route information. A hidden route is unusable, even if it is the best path.                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">show route hidden on page 1948</a><br><a href="#">show route hidden detail on page 1949</a><br><a href="#">show route hidden extensive on page 1949</a><br><a href="#">show route hidden terse on page 1949</a>                                                                                                      |
| <b>Output Fields</b>            | For information about output fields, see the output field table for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                    |

## Sample Output

### show route hidden

```

user@host> show route hidden
inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
127.0.0.1/32 [Direct/0] 04:26:38
 > via lo0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.5.5.5/32 [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
 AS path: 100 I
 Unusable
10.12.1.0/24 [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
 AS path: 100 I
 Unusable
10.12.80.4/30 [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
 AS path: I
 Unusable
...

```

### show route hidden detail

```

user@host> show route hidden detail

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
127.0.0.1/32 (1 entry, 0 announced)
 Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Hidden Martian Int>
 Local AS: 1
 Age: 4:27:37
 Task: IF
 AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete

10.5.5.5/32 (1 entry, 0 announced)
 BGP Preference: 170/-101
 Route Distinguisher: 10.4.4.4:4
 Next hop type: Unusable
 Next-hop reference count: 6
 State: <Secondary Hidden Int Ext>
 Local AS: 1 Peer AS: 1
 Age: 3:45:09
 Task: BGP_1.10.4.4.4+2493
 AS path: 100 I
 Communities: target:1:999
 VPN Label: 100064
 Localpref: 100
 Router ID: 10.4.4.4
 Primary Routing Table bgp.13vpn.0

...

```

### show route hidden extensive

The output for the **show route hidden extensive** command is identical to that of the **show route hidden detail** command. For sample output, see [show route hidden detail on page 1949](#).

### show route hidden terse

```

user@host> show route hidden terse

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
 127.0.0.1/32 D 0 >lo0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)

```

Restart Complete

+ = Active Route, - = Last Active, \* = Both

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---------------|-------|----------|----------|----------|---------|
| 10.5.5.5/32   | B 170 | 100      |          | Unusable | 100 I   |
| 10.12.1.0/24  | B 170 | 100      |          | Unusable | 100 I   |
| 10.12.80.4/30 | B 170 | 100      |          | Unusable | I       |

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

Restart Complete

bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)

Restart Complete

+ = Active Route, - = Last Active, \* = Both

| A Destination            | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|--------------------------|-------|----------|----------|----------|---------|
| 10.4.4.4:4:10.5.5.5/32   |       |          |          |          |         |
|                          | B 170 | 100      |          | Unusable | 100 I   |
| 10.4.4.4:4:10.12.1.0/24  |       |          |          |          |         |
|                          | B 170 | 100      |          | Unusable | 100 I   |
| 10.4.4.4:4:10.12.80.4/30 |       |          |          |          |         |
|                          | B 170 | 100      |          | Unusable | I       |

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

Restart Complete

private1\_\_\_.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)



## show route inactive-path

|                                    |                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1951</a><br><a href="#">Syntax (EX Series Switches) on page 1951</a>                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                      | <b>show route inactive-path</b><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switches)</b> | <b>show route inactive-path</b><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                             |
| <b>Description</b>                 | Display routes for destinations that have no active route. An inactive route is a route that was not selected as the best path.                                                                                                                                                                                                                                                   |
| <b>Options</b>                     | <b>none</b> —Display all inactive routes.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>       | <a href="#">show route inactive-path on page 1951</a><br><a href="#">show route inactive-path detail on page 1952</a><br><a href="#">show route inactive-path extensive on page 1953</a><br><a href="#">show route inactive-path terse on page 1953</a>                                                                                                                           |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                    |

## Sample Output

### show route inactive-path

```

user@host> show route inactive-path

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.12.100.12/30 [OSPF/10] 03:57:28, metric 1
> via so-0/3/0.0

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

```
10.0.0.0/8 [Direct/0] 04:39:56
 > via fxp1.0

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.12.80.0/30 [BGP/170] 04:38:17, localpref 100
 AS path: 100 I
 > to 10.12.80.1 via ge-6/3/2.0

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

#### show route inactive-path detail

```
user@host> show route inactive-path detail

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete

10.12.100.12/30 (2 entries, 1 announced)
 OSPF Preference: 10
 Next-hop reference count: 1
 Next hop: via so-0/3/0.0, selected
 State: <Int>
 Inactive reason: Route Preference
 Local AS: 1
 Age: 3:58:24 Metric: 1
 Area: 0.0.0.0
 Task: OSPF
 AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

10.0.0.0/8 (2 entries, 0 announced)
 Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via fxp1.0, selected
 State: <NotBest Int>
 Inactive reason: No difference
 Age: 4:40:52
 Task: IF
 AS path: I

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete

10.12.80.0/30 (2 entries, 1 announced)
```

```

BGP Preference: 170/-101
 Next-hop reference count: 6
 Source: 10.12.80.1
 Next hop: 10.12.80.1 via ge-6/3/2.0, selected
 State: <Ext>
 Inactive reason: Route Preference
 Peer AS: 100
 Age: 4:39:13
 Task: BGP_100.10.12.80.1+179
 AS path: 100 I
 Localpref: 100
 Router ID: 10.0.0.0

```

### show route inactive-path extensive

The output for the **show route inactive-path extensive** command is identical to that of the **show route inactive-path detail** command. For sample output, see [show route inactive-path detail on page 1952](#).

### show route inactive-path terse

```

user@host> show route inactive-path terse

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
10.12.100.12/30 0 10 1 >so-0/3/0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
10.0.0.0/8 D 0 >fxp1.0

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
10.12.80.0/30 B 170 100 >10.12.80.1 100 I

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

## show route inactive-prefix

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1954</a><br><a href="#">Syntax (EX Series Switches) on page 1954</a>                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                      | <code>show route inactive-prefix</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | <code>show route inactive-prefix</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                        |
| <b>Description</b>                 | Display inactive route destinations in each routing table.                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                     | <b>none</b> —Display all inactive route destination.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>       | <a href="#">show route inactive-prefix on page 1954</a><br><a href="#">show route inactive-prefix detail on page 1954</a><br><a href="#">show route inactive-prefix extensive on page 1955</a><br><a href="#">show route inactive-prefix terse on page 1955</a>                                                                                                                              |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                               |

## Sample Output

### show route inactive-prefix

```
user@host> show route inactive-prefix

inet.0: 14 destinations, 14 routes (13 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

127.0.0.1/32 [Direct/0] 00:04:54
> via lo0.0
```

### show route inactive-prefix detail

```
user@host> show route inactive-prefix detail

inet.0: 14 destinations, 14 routes (13 active, 0 holddown, 1 hidden)
```

```

127.0.0.1/32 (1 entry, 0 announced)
 Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Hidden Martian Int>
 Age: 4:51
 Task: IF
 AS path: I00:04:54
 > via lo0.0

```

### show route inactive-prefix extensive

The output for the **show route inactive-prefix extensive** command is identical to that of the **show route inactive-path detail** command. For sample output, see [show route inactive-prefix detail on page 1954](#).

### show route inactive-prefix terse

```
user@host> show route inactive-prefix terse
```

```
inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---------------|-------|----------|----------|----------|---------|
| 127.0.0.1/32  | D 0   |          |          | >lo0.0   |         |

## show route instance

---

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 1956</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 1956</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax</b>                                   | <pre>show route instance &lt;brief   detail   summary&gt; &lt;instance-name&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;operational&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show route instance &lt;brief   detail   summary&gt; &lt;instance-name&gt; &lt;operational&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                              | Display routing instance information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                                  | <p><b>none</b>—(Same as <b>brief</b>) Display standard information about all routing instances.</p> <p><b>brief   detail   summary</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>. (These options are not available with the <b>operational</b> keyword.)</p> <p><b>instance-name</b>—(Optional) Display information for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show route instance cust1</b> command).</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>operational</b>—(Optional) Display operational routing instances.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>                    | <a href="#">show route instance on page 1957</a><br><a href="#">show route instance detail (Graceful Restart Complete) on page 1958</a><br><a href="#">show route instance detail (Graceful Restart Incomplete) on page 1959</a><br><a href="#">show route instance detail (VPLS Routing Instance) on page 1961</a><br><a href="#">show route instance operational on page 1962</a><br><a href="#">show route instance summary on page 1962</a>                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>                            | <a href="#">Table 193 on page 1957</a> lists the output fields for the <b>show route instance</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 193: show route instance Output Fields

| Field Name                       | Field Description                                                                                                                                                                                                                                                  | Level of Output           |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Instance or <i>instance-name</i> | Name of the routing instance.                                                                                                                                                                                                                                      | All levels                |
| Operational Routing Instances    | ( <b>operational</b> keyword only) Names of all operational routing instances.                                                                                                                                                                                     | —                         |
| Type                             | Type of routing instance: <b>forwarding</b> , <b>l2vpn</b> , <b>no-forwarding</b> , <b>vpls</b> , <b>virtual-router</b> , or <b>vrf</b> .                                                                                                                          | All levels                |
| State                            | State of the routing instance: <b>active</b> or <b>inactive</b> .                                                                                                                                                                                                  | <b>brief detail none</b>  |
| Interfaces                       | Name of interfaces belonging to this routing instance.                                                                                                                                                                                                             | <b>brief detail none</b>  |
| Restart State                    | Status of graceful restart for this instance: <b>Pending</b> or <b>Complete</b> .                                                                                                                                                                                  | <b>detail</b>             |
| Path selection timeout           | Maximum amount of time, in seconds, remaining until graceful restart is declared complete. The default is <b>300</b> .                                                                                                                                             | <b>detail</b>             |
| Tables                           | Tables (and number of routes) associated with this routing instance.                                                                                                                                                                                               | <b>brief detail none</b>  |
| Route-distinguisher              | Unique route distinguisher associated with this routing instance.                                                                                                                                                                                                  | <b>detail</b>             |
| Vrf-import                       | VPN routing and forwarding instance import policy name.                                                                                                                                                                                                            | <b>detail</b>             |
| Vrf-export                       | VPN routing and forwarding instance export policy name.                                                                                                                                                                                                            | <b>detail</b>             |
| Vrf-import-target                | VPN routing and forwarding instance import target community name.                                                                                                                                                                                                  | <b>detail</b>             |
| Vrf-export-target                | VPN routing and forwarding instance export target community name.                                                                                                                                                                                                  | <b>detail</b>             |
| Fast-reroute-priority            | Fast reroute priority setting for a VPLS routing instance: <b>high</b> , <b>medium</b> , or <b>low</b> . The default is <b>low</b> .                                                                                                                               | <b>detail</b>             |
| Restart State                    | Restart state: <ul style="list-style-type: none"> <li><b>Pending:protocol-name</b>—List of protocols that have not yet completed graceful restart for this routing table.</li> <li><b>Complete</b>—All protocols have restarted for this routing table.</li> </ul> | <b>detail</b>             |
| Primary rib                      | Primary table for this routing instance.                                                                                                                                                                                                                           | <b>brief none summary</b> |
| Active/holddown/hidden           | Number of active, hold-down, and hidden routes.                                                                                                                                                                                                                    | All levels                |

## Sample Output

### show route instance

```

user@host> show route instance
Instance Type
 Primary RIB
master forwarding
Active/holddown/hidden

```

```

 inet.0 16/0/1
 iso.0 1/0/0
 mpls.0 0/0/0
 inet6.0 2/0/0
 l2circuit.0 0/0/0
__juniper_private1__ forwarding
__juniper_private1__.inet.0 12/0/0
__juniper_private1__.inet6.0 1/0/0

```

### show route instance detail (Graceful Restart Complete)

```

user@host> show route instance detail
master:
 Router ID: 10.255.14.176
 Type: forwarding State: Active
 Restart State: Complete Path selection timeout: 300
 Tables:
 inet.0 : 17 routes (15 active, 0 holddown, 1 hidden)
 Restart Complete
 inet.3 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Complete
 iso.0 : 1 routes (1 active, 0 holddown, 0 hidden)
 Restart Complete
 mpls.0 : 19 routes (19 active, 0 holddown, 0 hidden)
 Restart Complete
 bgp.l3vpn.0 : 10 routes (10 active, 0 holddown, 0 hidden)
 Restart Complete
 inet6.0 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Complete
 bgp.l2vpn.0 : 1 routes (1 active, 0 holddown, 0 hidden)
 Restart Complete
 BGP-INET:
 Router ID: 10.69.103.1
 Type: vrf State: Active
 Restart State: Complete Path selection timeout: 300
 Interfaces:
 t3-0/0/0.103
 Route-distinguisher: 10.255.14.176:103
 Vrf-import: [BGP-INET-import]
 Vrf-export: [BGP-INET-export]
 Tables:
 BGP-INET.inet.0 : 4 routes (4 active, 0 holddown, 0 hidden)
 Restart Complete
 BGP-L:
 Router ID: 10.69.104.1
 Type: vrf State: Active
 Restart State: Complete Path selection timeout: 300
 Interfaces:
 t3-0/0/0.104
 Route-distinguisher: 10.255.14.176:104
 Vrf-import: [BGP-L-import]
 Vrf-export: [BGP-L-export]
 Tables:
 BGP-L.inet.0 : 4 routes (4 active, 0 holddown, 0 hidden)
 Restart Complete
 BGP-L.mpls.0 : 3 routes (3 active, 0 holddown, 0 hidden)
 Restart Complete
 L2VPN:
 Router ID: 0.0.0.0
 Type: l2vpn State: Active
 Restart State: Complete Path selection timeout: 300

```



```

Interfaces:
 t3-0/0/0.512
Route-distinguisher: 10.255.14.176:512
Vrf-import: [L2VPN-import]
Vrf-export: [L2VPN-export]
Tables:
 L2VPN.l2vpn.0 : 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
LDP:
Router ID: 10.69.105.1
Type: vrf State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
 t3-0/0/0.105
Route-distinguisher: 10.255.14.176:105
Vrf-import: [LDP-import]
Vrf-export: [LDP-export]
Tables:
 LDP.inet.0 : 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
OSPF:
Router ID: 10.69.101.1
Type: vrf State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
 t3-0/0/0.101
Route-distinguisher: 10.255.14.176:101
Vrf-import: [OSPF-import]
Vrf-export: [OSPF-export]
Vrf-import-target: [target:11111
Tables:
 OSPF.inet.0 : 8 routes (7 active, 0 holddown, 0 hidden)
Restart Complete
RIP:
Router ID: 10.69.102.1
Type: vrf State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
 t3-0/0/0.102
Route-distinguisher: 10.255.14.176:102
Vrf-import: [RIP-import]
Vrf-export: [RIP-export]
Tables:
 RIP.inet.0 : 6 routes (6 active, 0 holddown, 0 hidden)
Restart Complete
STATIC:
Router ID: 10.69.100.1
Type: vrf State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
 t3-0/0/0.100
Route-distinguisher: 10.255.14.176:100
Vrf-import: [STATIC-import]
Vrf-export: [STATIC-export]
Tables:
 STATIC.inet.0 : 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

```

#### show route instance detail (Graceful Restart Incomplete)

```
user@host> show route instance detail
```

```
master:
 Router ID: 10.255.14.176
 Type: forwarding State: Active
 Restart State: Pending Path selection timeout: 300
 Tables:
 inet.0 : 17 routes (15 active, 1 holddown, 1 hidden)
 Restart Pending: OSPF LDP
 inet.3 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Pending: OSPF LDP
 iso.0 : 1 routes (1 active, 0 holddown, 0 hidden)
 Restart Complete
 mpls.0 : 23 routes (23 active, 0 holddown, 0 hidden)
 Restart Pending: LDP VPN
 bgp.l3vpn.0 : 10 routes (10 active, 0 holddown, 0 hidden)
 Restart Pending: BGP VPN
 inet6.0 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Complete
 bgp.l2vpn.0 : 1 routes (1 active, 0 holddown, 0 hidden)
 Restart Pending: BGP VPN
BGP-INET:
 Router ID: 10.69.103.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.103
 Route-distinguisher: 10.255.14.176:103
 Vrf-import: [BGP-INET-import]
 Vrf-export: [BGP-INET-export]
 Tables:
 BGP-INET.inet.0 : 6 routes (5 active, 0 holddown, 0 hidden)
 Restart Pending: VPN
BGP-L:
 Router ID: 10.69.104.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.104
 Route-distinguisher: 10.255.14.176:104
 Vrf-import: [BGP-L-import]
 Vrf-export: [BGP-L-export]
 Tables:
 BGP-L.inet.0 : 6 routes (5 active, 0 holddown, 0 hidden)
 Restart Pending: VPN
 BGP-L.mpls.0 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Pending: VPN
L2VPN:
 Router ID: 0.0.0.0
 Type: l2vpn State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.512
 Route-distinguisher: 10.255.14.176:512
 Vrf-import: [L2VPN-import]
 Vrf-export: [L2VPN-export]
 Tables:
 L2VPN.l2vpn.0 : 2 routes (2 active, 0 holddown, 0 hidden)
 Restart Pending: VPN L2VPN
LDP:
 Router ID: 10.69.105.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
```

```

Interfaces:
 t3-0/0/0.105
Route-distinguisher: 10.255.14.176:105
Vrf-import: [LDP-import]
Vrf-export: [LDP-export]
Tables:
 LDP.inet.0 : 5 routes (4 active, 1 holddown, 0 hidden)
Restart Pending: OSPF LDP VPN
OSPF:
 Router ID: 10.69.101.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.101
 Route-distinguisher: 10.255.14.176:101
 Vrf-import: [OSPF-import]
 Vrf-export: [OSPF-export]
 Tables:
 OSPF.inet.0 : 8 routes (7 active, 1 holddown, 0 hidden)
Restart Pending: OSPF VPN
RIP:
 Router ID: 10.69.102.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.102
 Route-distinguisher: 10.255.14.176:102
 Vrf-import: [RIP-import]
 Vrf-export: [RIP-export]
 Tables:
 RIP.inet.0 : 8 routes (6 active, 2 holddown, 0 hidden)
Restart Pending: RIP VPN
STATIC:
 Router ID: 10.69.100.1
 Type: vrf State: Active
 Restart State: Pending Path selection timeout: 300
 Interfaces:
 t3-0/0/0.100
 Route-distinguisher: 10.255.14.176:100
 Vrf-import: [STATIC-import]
 Vrf-export: [STATIC-export]
 Tables:
 STATIC.inet.0 : 4 routes (4 active, 0 holddown, 0 hidden)
Restart Pending: VPN

```

#### show route instance detail (VPLS Routing Instance)

```

user@host> show route instance detail test-vpls
test-vpls:
 Router ID: 0.0.0.0
 Type: vpls State: Active
 Interfaces:
 lsi.1048833
 lsi.1048832
 fe-0/1/0.513
 Route-distinguisher: 10.255.37.65:1
 Vrf-import: [__vrf-import-test-vpls-internal__]
 Vrf-export: [__vrf-export-test-vpls-internal__]
 Vrf-import-target: [target:300:1]
 Vrf-export-target: [target:300:1]
 Fast-reroute-priority: high

```

Tables:  
 test-vpls.l2vpn.0 : 3 routes (3 active, 0 holddown, 0 hidden)

### show route instance operational

```
user@host> show route instance operational
Operational Routing Instances:

master
default
```

### show route instance summary

```
user@host> show route instance summary
```

| Instance | Type       | Primary rib      | Active/holddown/hidden |
|----------|------------|------------------|------------------------|
| master   | forwarding | inet.0           | 15/0/1                 |
|          |            | iso.0            | 1/0/0                  |
|          |            | mpls.0           | 35/0/0                 |
|          |            | l3vpn.0          | 0/0/0                  |
|          |            | inet6.0          | 2/0/0                  |
|          |            | l2vpn.0          | 0/0/0                  |
|          |            | l2circuit.0      | 0/0/0                  |
|          |            |                  |                        |
| BGP-INET | vrf        | BGP-INET.inet.0  | 5/0/0                  |
|          |            | BGP-INET.iso.0   | 0/0/0                  |
|          |            | BGP-INET.inet6.0 | 0/0/0                  |
| BGP-L    | vrf        | BGP-L.inet.0     | 5/0/0                  |
|          |            | BGP-L.iso.0      | 0/0/0                  |
|          |            | BGP-L.mpls.0     | 4/0/0                  |
|          |            | BGP-L.inet6.0    | 0/0/0                  |
| L2VPN    | l2vpn      | L2VPN.inet.0     | 0/0/0                  |
|          |            | L2VPN.iso.0      | 0/0/0                  |
|          |            | L2VPN.inet6.0    | 0/0/0                  |
|          |            | L2VPN.l2vpn.0    | 2/0/0                  |
| LDP      | vrf        | LDP.inet.0       | 4/0/0                  |
|          |            | LDP.iso.0        | 0/0/0                  |
|          |            | LDP.mpls.0       | 0/0/0                  |
|          |            | LDP.inet6.0      | 0/0/0                  |
|          |            | LDP.l2circuit.0  | 0/0/0                  |
| OSPF     | vrf        | OSPF.inet.0      | 7/0/0                  |
|          |            | OSPF.iso.0       | 0/0/0                  |
|          |            | OSPF.inet6.0     | 0/0/0                  |
| RIP      | vrf        | RIP.inet.0       | 6/0/0                  |
|          |            | RIP.iso.0        | 0/0/0                  |
|          |            | RIP.inet6.0      | 0/0/0                  |
| STATIC   | vrf        | STATIC.inet.0    | 4/0/0                  |
|          |            | STATIC.iso.0     | 0/0/0                  |
|          |            | STATIC.inet6.0   | 0/0/0                  |

## show route label

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1963</a><br><a href="#">Syntax (EX Series Switches) on page 1963</a>                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>                      | show route label <i>label</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b> | show route label <i>label</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.5 for EX Series switches.                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>                 | Display the routes based on a specified Multiprotocol Label Switching (MPLS) label value.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                     | <i>label</i> —Value of the MPLS label.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                           |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li><a href="#">Example: Configuring Multipoint LDP In-Band Signaling for Point-to-Multipoint LSPs</a></li> </ul>                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>       | <a href="#">show route label terse on page 1963</a><br><a href="#">show route label on page 1964</a><br><a href="#">show route label detail on page 1964</a><br><a href="#">show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 1964</a><br><a href="#">show route label detail (Multipoint LDP with Multicast-Only Fast Reroute) on page 1965</a><br><a href="#">show route label extensive on page 1965</a> |
| <b>Output Fields</b>               | For information about output fields, see the output field table for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                            |

## Sample Output

### show route label terse

```

user@host> show route label 100016 terse

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

```

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|---------------|-------|----------|----------|-------------|---------|
| * 100016      | V 170 |          |          | >10.12.80.1 |         |

### show route label

```
user@host> show route label 100016
```

```
mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
100016 *[VPN/170] 03:25:41
 > to 10.12.80.1 via ge-6/3/2.0, Pop
```

### show route label detail

```
user@host> show route label 100016 detail
```

```
mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
100016 (1 entry, 1 announced)
 *VPN Preference: 170
 Next-hop reference count: 2
 Source: 10.12.80.1
 Next hop: 10.12.80.1 via ge-6/3/2.0, selected
 Label operation: Pop
 State: <Active Int Ext>
 Local AS: 1
 Age: 3:23:31
 Task: BGP.0.0.0.0+179
 Announcement bits (1): 0-KRT
 AS path: 100 I
 Ref Cnt: 2
```

### show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```
user@host> show route label 299872 detail
```

```
mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
 *LDP Preference: 9
 Next hop type: Flood
 Next-hop reference count: 3
 Address: 0x9097d90
 Next hop: via vt-0/1/0.1
 Next-hop index: 661
 Label operation: Pop
 Address: 0x9172130
 Next hop: via so-0/0/3.0
 Next-hop index: 654
 Label operation: Swap 299872
 State: **Active Int>
 Local AS: 1001
 Age: 8:20 Metric: 1
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 FECs bound to route: P2MP root-addr 10.255.72.166, grp 232.1.1.1,
src 192.168.142.2
```

**show route label detail (Multipoint LDP with Multicast-Only Fast Reroute)**

```

user@host> show route label 301568 detail

mpls.0: 18 destinations, 18 routes (18 active, 0 holddown, 0 hidden)
301568 (1 entry, 1 announced)
 *LDP Preference: 9
 Next hop type: Flood
 Address: 0x2735208
 Next-hop reference count: 3
 Next hop type: Router, Next hop index: 1397
 Address: 0x2735d2c
 Next-hop reference count: 3
 Next hop: 1.3.8.2 via ge-1/2/22.0
 Label operation: Pop
 Load balance label: None;
 Next hop type: Router, Next hop index: 1395
 Address: 0x2736290
 Next-hop reference count: 3
 Next hop: 1.3.4.2 via ge-1/2/18.0
 Label operation: Pop
 Load balance label: None;
 State: <Active Int AckRequest MulticastRPF>
 Local AS: 10
 Age: 54:05 Metric: 1
 Validation State: unverified
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 FECs bound to route: P2MP root-addr 1.1.1.1, grp: 232.1.1.1, src:
192.168.219.11
 Primary Upstream : 1.1.1.3:0--1.1.1.2:0
 RPF Nexthops :
 ge-1/2/15.0, 1.2.94.1, Label: 301568, weight: 0x1
 ge-1/2/14.0, 1.2.3.1, Label: 301568, weight: 0x1
 Backup Upstream : 1.1.1.3:0--1.1.1.6:0
 RPF Nexthops :
 ge-1/2/20.0, 1.2.96.1, Label: 301584, weight: 0xffffe
 ge-1/2/19.0, 1.3.6.1, Label: 301584, weight: 0xffffe

```

**show route label extensive**

The output for the **show route label extensive** command is identical to that of the **show route label detail** command. For sample output, see [show route label detail on page 1964](#).

## show route label-switched-path

---

|                                    |                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1966</a><br><a href="#">Syntax (EX Series Switches) on page 1966</a>                                                                                                                                                                                                            |
| <b>Syntax</b>                      | <code>show route label-switched-path <i>path-name</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                          |
| <b>Syntax (EX Series Switches)</b> | <code>show route label-switched-path <i>path-name</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                    |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.5 for EX Series switches.                                                                                                                                                                                      |
| <b>Description</b>                 | Display the routes used in an MPLS label-switched path (LSP).                                                                                                                                                                                                                                              |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b><i>path-name</i></b> —LSP tunnel name.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>       | <a href="#">show route label-switched-path on page 1966</a>                                                                                                                                                                                                                                                |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                             |

## Sample Output

### show route label-switched-path

```
user@host> show route label-switched-path sf-to-ny
inet.0: 29 destinations, 29 routes (29 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.1/32 [MPLS/7] 00:00:06, metric 0
> to 111.222.1.9 via s0-0/0/0, label-switched-path sf-to-ny
3.3.3.3/32 * [MPLS/7] 00:00:06, metric 0
> to 111.222.1.9 via s0-0/0/0, label-switched-path sf-to-ny

inet.3: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

2.2.2.2/32 * [MPLS/7] 00:00:06, metric 0
> to 111.222.1.9 via s0-0/0/0, label-switched-path sf-to-ny
4.4.4.4/32 * [MPLS/7] 00:00:06, metric 0
> to 111.222.1.9 via s0-0/0/0, label-switched-path abc
> to 111.222.1.9 via s0-0/0/0, label-switched-path xyz
> to 111.222.1.9 via s0-0/0/0, label-switched-path sf-to-ny
```



```
111.222.1.9/32 [MPLS/7] 00:00:06, metric 0
 > to 111.222.1.9 via s0-0/0/0, label-switched-path sf-to-ny

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

mpls.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
```

## show route localization

|                                 |                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route localization                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.4 for T-Series routers.<br>Command introduced in Junos OS Release 12.3 for MX Series routers.                                |
| <b>Description</b>              | (T320, T640, and T1600 routers only) Display route localization details.                                                                                               |
| <b>Options</b>                  | <b>detail</b> —Display detailed output.                                                                                                                                |
| <b>Required Privilege Level</b> | view                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Example: Configuring Packet Forwarding Engine FIB Localization</i></li> </ul>                                                |
| <b>Output Fields</b>            | Table 194 on page 1968 lists the output fields for the <b>show route localization</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 194: show route localization Output Fields**

| Field Name        | Field Description                                                      |
|-------------------|------------------------------------------------------------------------|
| <b>FIB-local</b>  | FPCs configured as FIB-local.                                          |
| <b>FIB-remote</b> | FPCs configured as FIB-remote.                                         |
| <b>Normal</b>     | FPCs neither configured as <b>FIB-local</b> or <b>FIB-remote</b> .     |
| <b>Protocols</b>  | IPv4 (inet) or IPv6 (inet6) traffic configured for route localization. |

## Sample Output

```

user@R0> show route localization
FIB localization ready FPCs (and FIB-local Forwarding Engine addresses)
 FIB-local: FPC2(4,5)
 FIB-remote: FPC0, FPC1
 Normal: FPC3, FPC4, FPC5, FPC6, FPC7

user@R0> show route localization detail
FIB localization ready FPCs (and FIB-local Forwarding Engine addresses)
 FIB-local: FPC2(4,5)
 FIB-remote: FPC0, FPC1
 Normal: FPC3, FPC4, FPC5, FPC6, FPC7
FIB localization configuration
 Protocols: inet, inet6
 FIB-local: FPC2
 FIB-remote: FPC0, FPC1
Forwarding Engine addresses
 FPC0: 1
 FPC1: 2
 FPC2: 4, 5

```

FPC3: 6  
FPC4: 8  
FPC5: 11  
FPC6: 13  
FPC7: 15

## show route martians

**List of Syntax** [Syntax on page 1970](#)  
[Syntax \(EX Series Switches\) on page 1970](#)

**Syntax** show route martians  
<logical-system (all | *logical-system-name*)>  
<table *routing-table-name*>

**Syntax (EX Series Switches)** show route martians  
<table *routing-table-name*>

**Release Information** Command introduced before Junos OS Release 7.4.  
Command introduced in Junos OS Release 9.0 for EX Series switches.

**Description** Display the martian (invalid and ignored) entries associated with each routing table.

**Options** **none**—Display standard information about route martians for all routing tables.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**table *routing-table-name***—(Optional) Display information about route martians for all routing tables whose name begins with this string (for example, **inet.0** and **inet6.0** are both displayed when you run the **show route martians table inet** command).

**Required Privilege Level** view

**Related Documentation**

- *Example: Configuring Class E Martian Addresses for Routing*
- *Understanding Martian Addresses*

**List of Sample Output** [show route martians on page 1971](#)

**Output Fields** [Table 195 on page 1970](#) lists the output fields for the **show route martians** command. Output fields are listed in the approximate order in which they appear

**Table 195: show route martians Output Fields**

| Field Name                | Field Description                                           |
|---------------------------|-------------------------------------------------------------|
| <i>table-name</i>         | Name of the route table in which the route martians reside. |
| <i>destination-prefix</i> | Route destination.                                          |
| <i>match value</i>        | Route match parameter.                                      |
| <i>status</i>             | Status of the route: <b>allowed</b> or <b>disallowed</b> .  |

## Sample Output

### show route martians

```

user@host> show route martians

inet.0:
 0.0.0.0/0 exact -- allowed
 0.0.0.0/8 orlonger -- disallowed
 127.0.0.0/8 orlonger -- disallowed
 192.0.0.0/24 orlonger -- disallowed
 240.0.0.0/4 orlonger -- disallowed
 224.0.0.0/4 exact -- disallowed
 224.0.0.0/24 exact -- disallowed

inet.1:
 0.0.0.0/0 exact -- allowed
 0.0.0.0/8 orlonger -- disallowed
 127.0.0.0/8 orlonger -- disallowed
 192.0.0.0/24 orlonger -- disallowed
 240.0.0.0/4 orlonger -- disallowed

inet.2:
 0.0.0.0/0 exact -- allowed
 0.0.0.0/8 orlonger -- disallowed
 127.0.0.0/8 orlonger -- disallowed
 192.0.0.0/24 orlonger -- disallowed
 240.0.0.0/4 orlonger -- disallowed
 224.0.0.0/4 exact -- disallowed
 224.0.0.0/24 exact -- disallowed

inet.3:
 0.0.0.0/0 exact -- allowed
 0.0.0.0/8 orlonger -- disallowed
 127.0.0.0/8 orlonger -- disallowed
 192.0.0.0/24 orlonger -- disallowed
 240.0.0.0/4 orlonger -- disallowed
 224.0.0.0/4 exact -- disallowed
 224.0.0.0/24 exact -- disallowed

...

inet6.0:
 ::1/128 exact -- disallowed
 ff00::/8 exact -- disallowed
 ff02::/16 exact -- disallowed

inet6.1:
 ::1/128 exact -- disallowed

inet6.2:
 ::1/128 exact -- disallowed
 ff00::/8 exact -- disallowed
 ff02::/16 exact -- disallowed

inet6.3:
 ::1/128 exact -- disallowed
 ff00::/8 exact -- disallowed
 ff02::/16 exact -- disallowed

...

```

## show route match-prefix

---

|                                 |                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show route match-prefix <i>match-prefix</i>;</code>                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.4.                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Allows you to search for routes using regular expressions based on the extended (modern) regular expressions as defined in POSIX 1003.2.                                                                                                                                                                                            |
| <b>Options</b>                  | <i>match-prefix</i> —Regular expression to match formatted prefix.                                                                                                                                                                                                                                                                  |
| <b>Additional Information</b>   |                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <i>Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands</i>                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show route match-prefix *:10.255.2.200:6:* (Show all routes matching route distributor 10.255.2.200:6) on page 1972</a><br><a href="#">show route match-prefix 7* (Show all mvpn type-7 routes) on page 1972</a><br><a href="#">show route match-prefix *:224.* (Show all routes matching group 224/4) on page 1972</a> |
| <b>Output Fields</b>            | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                      |

## Sample Output

[show route match-prefix \\*:10.255.2.200:6:\\* \(Show all routes matching route distributor 10.255.2.200:6\)](#)

```
user@host> show route match-prefix *:10.255.2.200:6:*
```

[show route match-prefix 7\\* \(Show all mvpn type-7 routes\)](#)

```
user@host> show route table blue.mvpn.0 match-prefix 7*
Paste
router command output here
```

[show route match-prefix \\*:224.\\* \(Show all routes matching group 224/4\)](#)

```
user@host> show route match-prefix *:224.*
```

## show route next-hop

|                                    |                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1973</a><br><a href="#">Syntax (EX Series Switches) on page 1973</a>                                                                                                                                                                                                            |
| <b>Syntax</b>                      | <b>show route next-hop</b> <i>next-hop</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | <b>show route next-hop</b> <i>next-hop</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                      |
| <b>Description</b>                 | Display the entries in the routing table that are being sent to the specified next-hop address.                                                                                                                                                                                                            |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>next-hop</i></b> —Next-hop address. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>       | <a href="#">show route next-hop on page 1973</a><br><a href="#">show route next-hop detail on page 1974</a><br><a href="#">show route next-hop extensive on page 1976</a><br><a href="#">show route next-hop terse on page 1977</a>                                                                        |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                             |

## Sample Output

### show route next-hop

```

user@host> show route next-hop 192.168.71.254

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.10.0.0/16 *[Static/5] 06:26:25
 > to 192.168.71.254 via fxp0.0
10.209.0.0/16 *[Static/5] 06:26:25
 > to 192.168.71.254 via fxp0.0
172.16.0.0/12 *[Static/5] 06:26:25
 > to 192.168.71.254 via fxp0.0
192.168.0.0/16 *[Static/5] 06:26:25

```

```

> to 192.168.71.254 via fxp0.0
192.168.102.0/23 *[Static/5] 06:26:25
> to 192.168.71.254 via fxp0.0
207.17.136.0/24 *[Static/5] 06:26:25
> to 192.168.71.254 via fxp0.0
207.17.136.192/32 *[Static/5] 06:26:25
> to 192.168.71.254 via fxp0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

#### show route next-hop detail

```

user@host> show route next-hop 192.168.71.254 detail

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
Restart Complete
10.10.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

10.209.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

172.16.0.0/12 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2

```



```

AS path: I

192.168.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

192.168.102.0/23 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

207.17.136.0/24 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

207.17.136.192/32 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 36
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 1
 Age: 6:27:41
 Task: RT
 Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
 AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

### show route next-hop extensive

```
user@host> show route next-hop 192.168.71.254 extensive
```

```
inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
10.209.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 10.209.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
172.16.0.0/12 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 172.16.0.0/12 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
192.168.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 192.168.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
192.168.102.0/23 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 192.168.102.0/23 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```

Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

207.17.136.0/24 (1 entry, 1 announced)
TSI:
KRT in-kerne1 207.17.136.0/24 -> {192.168.71.254}
*Static Preference: 5
Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

207.17.136.192/32 (1 entry, 1 announced)
TSI:
KRT in-kerne1 207.17.136.192/32 -> {192.168.71.254}
*Static Preference: 5
Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

green.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

red.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

### show route next-hop terse

```

user@host> show route next-hop 192.168.71.254 terse

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 10.10.0.0/16 S 5 0 0 >192.168.71.254
* 10.209.0.0/16 S 5 0 0 >192.168.71.254
* 172.16.0.0/12 S 5 0 0 >192.168.71.254

```

```

* 192.168.0.0/16 S 5 >192.168.71.254
* 192.168.102.0/23 S 5 >192.168.71.254
* 207.17.136.0/24 S 5 >192.168.71.254
* 207.17.136.192/32 S 5 >192.168.71.254

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

## show route no-community

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1979</a><br><a href="#">Syntax (EX Series Switches) on page 1979</a>                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                      | show route no-community<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switches)</b> | show route no-community<br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                |
| <b>Description</b>                 | Display the route entries in each routing table that are not associated with any community.                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <p><b>none</b>—(Same as <b>brief</b>) Display the route entries in each routing table that are not associated with any community.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>       | <a href="#">show route no-community on page 1979</a><br><a href="#">show route no-community detail on page 1980</a><br><a href="#">show route no-community extensive on page 1980</a><br><a href="#">show route no-community terse on page 1981</a>                                                                                                                                                  |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                       |

## Sample Output

### show route no-community

```

user@host> show route no-community
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.10.0.0/16 *[Static/5] 00:36:27
> to 192.168.71.254 via fxp0.0
10.209.0.0/16 *[Static/5] 00:36:27
> to 192.168.71.254 via fxp0.0
10.255.71.52/32 *[Direct/0] 00:36:27
> via lo0.0
10.255.71.63/32 *[OSPF/10] 00:04:39, metric 1
> to 35.1.1.2 via ge-3/1/0.0
10.255.71.64/32 *[OSPF/10] 00:00:08, metric 2

```

```

> to 35.1.1.2 via ge-3/1/0.0
10.255.71.240/32 * [OSPF/10] 00:05:04, metric 2
 via so-0/1/2.0
> via so-0/3/2.0
10.255.71.241/32 * [OSPF/10] 00:05:14, metric 1
> via so-0/1/2.0
10.255.71.242/32 * [OSPF/10] 00:05:19, metric 1
> via so-0/3/2.0
12.1.1.0/24 * [OSPF/10] 00:05:14, metric 2
> via so-0/3/2.0
14.1.1.0/24 * [OSPF/10] 00:00:08, metric 3
> to 35.1.1.2 via ge-3/1/0.0
 via so-0/1/2.0
 via so-0/3/2.0
16.1.1.0/24 * [OSPF/10] 00:05:14, metric 2
> via so-0/1/2.0
.....

```

### show route no-community detail

```

user@host> show route no-community detail

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 38:08
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

10.209.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 38:08
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

....

```

### show route no-community extensive

```

user@host> show route no-community extensive

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 2:03:33
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

```

```

10.209.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.209.0.0/16 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Local AS: 69
 Age: 2:03:33
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

```

### show route no-community terse

```
user@host> show route no-community terse
```

```

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

```

| A   | Destination      | P | Prf | Metric 1 | Metric 2 | Next hop        | AS path |
|-----|------------------|---|-----|----------|----------|-----------------|---------|
| *   | 10.10.0.0/16     | S | 5   |          |          | >192.168.71.254 |         |
| *   | 10.209.0.0/16    | S | 5   |          |          | >192.168.71.254 |         |
| *   | 10.255.71.52/32  | D | 0   |          |          | >lo0.0          |         |
| *   | 10.255.71.63/32  | O | 10  | 1        |          | >35.1.1.2       |         |
| *   | 10.255.71.64/32  | O | 10  | 2        |          | >35.1.1.2       |         |
| *   | 10.255.71.240/32 | O | 10  | 2        |          | so-0/1/2.0      |         |
|     |                  |   |     |          |          | >so-0/3/2.0     |         |
| *   | 10.255.71.241/32 | O | 10  | 1        |          | >so-0/1/2.0     |         |
| *   | 10.255.71.242/32 | O | 10  | 1        |          | >so-0/3/2.0     |         |
| *   | 12.1.1.0/24      | O | 10  | 2        |          | >so-0/3/2.0     |         |
| *   | 14.1.1.0/24      | O | 10  | 3        |          | >35.1.1.2       |         |
|     |                  |   |     |          |          | so-0/1/2.0      |         |
|     |                  |   |     |          |          | so-0/3/2.0      |         |
| *   | 16.1.1.0/24      | O | 10  | 2        |          | >so-0/1/2.0     |         |
| ... |                  |   |     |          |          |                 |         |

## show route output

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax              | <a href="#">Syntax on page 1982</a><br><a href="#">Syntax (EX Series Switches) on page 1982</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Syntax                      | <code>show route output (address <i>ip-address</i>   interface <i>interface-name</i>)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Syntax (EX Series Switches) | <code>show route output (address <i>ip-address</i>   interface <i>interface-name</i>)</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Release Information         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description                 | <p>Display the entries in the routing table learned through static routes and interior gateway protocols that are to be sent out the interface with either the specified IP address or specified name.</p> <p>To view routes advertised to a neighbor or received from a neighbor for the BGP protocol, use the <b>show route advertising-protocol bgp</b> and <b>show route receive-protocol bgp</b> commands instead.</p>                                                                                                                                                                                                               |
| Options                     | <p><b>address <i>ip-address</i></b>—Display entries in the routing table that are to be sent out the interface with the specified IP address.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.</p> <p><b>interface <i>interface-name</i></b>—Display entries in the routing table that are to be sent out the interface with the specified name.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| List of Sample Output       | <a href="#">show route output address on page 1983</a><br><a href="#">show route output address detail on page 1983</a><br><a href="#">show route output address extensive on page 1984</a><br><a href="#">show route output address terse on page 1984</a><br><a href="#">show route output interface on page 1984</a><br><a href="#">show route output interface detail on page 1985</a><br><a href="#">show route output interface extensive on page 1985</a><br><a href="#">show route output interface terse on page 1985</a>                                                                                                        |
| Output Fields               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                                            |



## Sample Output

### show route output address

```

user@host> show route output address 36.1.1.1/24

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

36.1.1.0/24 *[Direct/0] 00:19:56
 > via so-0/1/2.0
 [OSPF/10] 00:19:55, metric 1
 > via so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

### show route output address detail

```

user@host> show route output address 36.1.1.1 detail

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
36.1.1.0/24 (2 entries, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via so-0/1/2.0, selected
 State: <Active Int>
 Age: 23:00
 Task: IF
 AS path: I
 OSPF Preference: 10
 Next-hop reference count: 1
 Next hop: via so-0/1/2.0, selected
 State: <Int>
 Inactive reason: Route Preference
 Age: 22:59 Metric: 1
 Area: 0.0.0.0
 Task: OSPF
 AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

### show route output address extensive

The output for the **show route output address extensive** command is identical to that of the **show route output address detail** command. For sample output, see [show route output address detail on page 1983](#).

### show route output address terse

```
user@host> show route output address 36.1.1.1 terse

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 36.1.1.0/24 D 0 >so-0/1/2.0
 O 10 1 >so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

### show route output interface

```
user@host> show route output interface so-0/1/2.0

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.71.240/32 *[OSPF/10] 00:13:00, metric 2
 via so-0/1/2.0
 > via so-0/3/2.0
10.255.71.241/32 *[OSPF/10] 00:13:10, metric 1
 > via so-0/1/2.0
14.1.1.0/24 *[OSPF/10] 00:05:11, metric 3
 to 35.1.1.2 via ge-3/1/0.0
 > via so-0/1/2.0
 via so-0/3/2.0
16.1.1.0/24 *[OSPF/10] 00:13:10, metric 2
 > via so-0/1/2.0
36.1.1.0/24 *[Direct/0] 00:13:21
 > via so-0/1/2.0
 [OSPF/10] 00:13:20, metric 1
 > via so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

### show route output interface detail

```
user@host> show route output interface so-0/1/2.0 detail
```

```
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
10.255.71.240/32 (1 entry, 1 announced)
 *OSPF Preference: 10
 Next-hop reference count: 2
 Next hop: via so-0/1/2.0
 Next hop: via so-0/3/2.0, selected
 State: <Active Int>
 Age: 14:52 Metric: 2
 Area: 0.0.0.0
 Task: OSPF
 Announcement bits (1): 0-KRT
 AS path: I

10.255.71.241/32 (1 entry, 1 announced)
 *OSPF Preference: 10
 Next-hop reference count: 4
 Next hop: via so-0/1/2.0, selected
 State: <Active Int>
 Age: 15:02 Metric: 1
 Area: 0.0.0.0
 Task: OSPF
 Announcement bits (1): 0-KRT
 AS path: I

...
```

### show route output interface extensive

The output for the **show route output interface extensive** command is identical to that of the **show route output interface detail** command. For sample output, see [show route output interface detail on page 1985](#).

### show route output interface terse

```
user@host> show route output interface so-0/1/2.0 terse
```

```
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 10.255.71.240/32 0 10 2 so-0/1/2.0
 >so-0/3/2.0
* 10.255.71.241/32 0 10 1 >so-0/1/2.0
* 14.1.1.0/24 0 10 3 35.1.1.2
 >so-0/1/2.0
 so-0/3/2.0
* 16.1.1.0/24 0 10 2 >so-0/1/2.0
* 36.1.1.0/24 D 0
 0 10 1 >so-0/1/2.0
 >so-0/1/2.0

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
```

```
private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route protocol

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1987</a><br><a href="#">Syntax (EX Series Switches) on page 1987</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax</b>                      | <pre>show route protocol <i>protocol</i> &lt;brief   detail   extensive   terse&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b> | <pre>show route protocol <i>protocol</i> &lt;brief   detail   extensive   terse&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Options <b>ospf2</b> and <b>ospf3</b> introduced in Junos OS Release 9.2.</p> <p>Options <b>ospf2</b> and <b>ospf3</b> introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Option <b>flow</b> introduced in Junos OS Release 10.0.</p> <p>Option <b>flow</b> introduced in Junos OS Release 10.0 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                 | Display the route entries in the routing table that were learned from a particular protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                     | <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>protocol</i></b>—Protocol from which the route was learned:</p> <ul style="list-style-type: none"> <li>• <b>access</b>—Access route for use by DHCP application</li> <li>• <b>access-internal</b>—Access-internal route for use by DHCP application</li> <li>• <b>aggregate</b>—Locally generated aggregate route</li> <li>• <b>atmvpn</b>—Asynchronous Transfer Mode virtual private network</li> <li>• <b>bgp</b>—Border Gateway Protocol</li> <li>• <b>ccc</b>—Circuit cross-connect</li> <li>• <b>direct</b>—Directly connected route</li> <li>• <b>dvmrp</b>—Distance Vector Multicast Routing Protocol</li> <li>• <b>esis</b>—End System-to-Intermediate System</li> <li>• <b>flow</b>—Locally defined flow-specification route.</li> <li>• <b>isis</b>—Intermediate System-to-Intermediate System</li> <li>• <b>ldp</b>—Label Distribution Protocol</li> <li>• <b>l2circuit</b>—Layer 2 circuit</li> <li>• <b>l2vpn</b>—Layer 2 virtual private network</li> <li>• <b>local</b>—Local address</li> </ul> |

- **mpls**—Multiprotocol Label Switching
- **msdp**—Multicast Source Discovery Protocol
- **ospf**—Open Shortest Path First versions 2 and 3
- **ospf2**—Open Shortest Path First version 2 only
- **ospf3**—Open Shortest Path First version 3 only
- **pim**—Protocol Independent Multicast
- **rip**—Routing Information Protocol
- **ripng**—Routing Information Protocol next generation
- **rsvp**—Resource Reservation Protocol
- **rtarget**—Local route target virtual private network
- **static**—Statically defined route
- **tunnel**—Dynamic tunnel
- **vpn**—Virtual private network



**NOTE:** EX Series switches run a subset of these protocols. See the switch CLI for details.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>    | <a href="#">show route protocol access on page 1989</a><br><a href="#">show route protocol access-internal extensive on page 1989</a><br><a href="#">show route protocol bgp on page 1989</a><br><a href="#">show route protocol bgp detail on page 1989</a><br><a href="#">show route protocol bgp extensive on page 1990</a><br><a href="#">show route protocol bgp terse on page 1990</a><br><a href="#">show route protocol direct on page 1990</a><br><a href="#">show route protocol l2circuit detail on page 1991</a><br><a href="#">show route protocol l2vpn extensive on page 1992</a><br><a href="#">show route protocol ldp on page 1992</a><br><a href="#">show route protocol ldp extensive on page 1993</a><br><a href="#">show route protocol ospf (Layer 3 VPN) on page 1994</a><br><a href="#">show route protocol ospf detail on page 1995</a><br><a href="#">show route protocol rip on page 1995</a><br><a href="#">show route protocol rip detail on page 1995</a><br><a href="#">show route protocol ripng table inet6 on page 1995</a> |
| <b>Output Fields</b>            | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### show route protocol access

```
user@host> show route protocol access
inet.0: 30380 destinations, 30382 routes (30379 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

13.160.0.3/32 *[Access/13] 00:00:09
 > to 13.160.0.2 via fe-0/0/0.0
13.160.0.4/32 *[Access/13] 00:00:09
 > to 13.160.0.2 via fe-0/0/0.0
13.160.0.5/32 *[Access/13] 00:00:09
 > to 13.160.0.2 via fe-0/0/0.0
```

### show route protocol access-internal extensive

```
user@host> show route protocol access-internal 13.160.0.19 extensive
inet.0: 100020 destinations, 100022 routes (100019 active, 0 holddown, 1 hidden)
13.160.0.19/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 13.160.0.19/32 -> {13.160.0.2}
 *Access-internal Preference: 12
 Next-hop reference count: 200000
 Next hop: 13.160.0.2 via fe-0/0/0.0, selected
 State: <Active Int>
 Age: 36
 Task: RPD Unix Domain Server./var/run/rpd_serv.local
 Announcement bits (1): 0-KRT
 AS path: I
```

### show route protocol bgp

```
user@host> show route protocol bgp 192.168.64.0/21
inet.0: 335832 destinations, 335833 routes (335383 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.64.0/21 *[BGP/170] 6d 10:41:16, localpref 100, from 192.168.69.71
 AS path: 10458 14203 2914 4788 4788 I
 > to 192.168.167.254 via fxp0.0
```

### show route protocol bgp detail

```
show route protocol bgp 66.117.63.0/24 exact detail
inet.0: 335805 destinations, 335806 routes (335356 active, 0 holddown, 450 hidden)
66.117.63.0/24 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Next hop type: Indirect
 Next-hop reference count: 1006436
 Source: 192.168.69.71
 Next hop type: Router, Next hop index: 324
 Next hop: 192.168.167.254 via fxp0.0, selected
 Protocol next hop: 192.168.69.71
 Indirect next hop: 8e166c0 342
 State: <Active Ext>
 Local AS: 69 Peer AS: 10458
 Age: 6d 10:42:42 Metric2: 0
 Task: BGP_10458.192.168.69.71+179
 Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree
1
 AS path: 10458 14203 2914 4788 4788 I
```

```
Communities: 2914:410 2914:2403 2914:3400
Accepted
Localpref: 100
Router ID: 207.17.136.192
```

### show route protocol bgp extensive

```
user@host> show route protocol bgp 192.168.64.0/21 extensive

inet.0: 335827 destinations, 335828 routes (335378 active, 0 holddown, 450 hidden)
192.168.64.0/21 (1 entry, 1 announced)
TSI:
KRT in-kernel 1.9.0.0/16 -> {indirect(342)}
Page 0 idx 1 Type 1 val db31a80
 Nexthop: Self
 AS path: [69] 10458 14203 2914 4788 4788 I
 Communities: 2914:410 2914:2403 2914:3400
Path 1.9.0.0 from 192.168.69.71 Vector len 4. Val: 1
 *BGP Preference: 170/-101
 Next hop type: Indirect
 Next-hop reference count: 1006502
 Source: 192.168.69.71
 Next hop type: Router, Next hop index: 324
 Next hop: 192.168.167.254 via fxp0.0, selected
 Protocol next hop: 192.168.69.71
 Indirect next hop: 8e166c0 342
 State: <Active Ext>
 Local AS: 69 Peer AS: 10458
 Age: 6d 10:44:45 Metric2: 0
 Task: BGP_10458.192.168.69.71+179
 Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree

1
 AS path: 10458 14203 2914 4788 4788 I
 Communities: 2914:410 2914:2403 2914:3400
 Accepted
 Localpref: 100
 Router ID: 207.17.136.192
 Indirect next hops: 1
 Protocol next hop: 192.168.69.71
 Indirect next hop: 8e166c0 342
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 192.168.167.254 via fxp0.0
 192.168.0.0/16 Originating RIB: inet.0
 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: 192.168.167.254 via fxp0.0
```

### show route protocol bgp terse

```
user@host> show route protocol bgp 192.168.64.0/21 terse

inet.0: 24 destinations, 32 routes (23 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

| A Destination   | P Prf | Metric 1 | Metric 2 | Next hop   | AS path    |
|-----------------|-------|----------|----------|------------|------------|
| 192.168.64.0/21 | B 170 | 100      |          | >100.1.3.2 | 10023 21 I |

### show route protocol direct

```
user@host> show route protocol direct
```



```

inet.0: 335843 destinations, 335844 routes (335394 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

8.8.8.0/24 *[Direct/0] 17w0d 10:31:49
 > via fe-1/3/1.0
10.255.165.1/32 *[Direct/0] 25w4d 04:13:18
 > via lo0.0
30.30.30.0/24 *[Direct/0] 17w0d 23:06:26
 > via fe-1/3/2.0
192.168.164.0/22 *[Direct/0] 25w4d 04:13:20
 > via fxp0.0

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

47.0005.80ff.f800.0000.0108.0001.0102.5516.5001/152
 *[Direct/0] 25w4d 04:13:21
 > via lo0.0

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

abcd::10:255:165:1/128
 *[Direct/0] 25w4d 04:13:21
 > via lo0.0
fe80::2a0:a5ff:fe12:ad7/128
 *[Direct/0] 25w4d 04:13:21
 > via lo0.0

```

### show route protocol l2circuit detail

```

user@host> show route protocol l2circuit detail

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
100000 (1 entry, 1 announced)
 *L2CKT Preference: 7
 Next hop: via ge-2/0/0.0, selected
 Label operation: Pop Offset: 4
 State: <Active Int>
 Local AS: 99
 Age: 9:52
 Task: Common L2 VC
 Announcement bits (1): 0-KRT
 AS path: I

ge-2/0/0.0 (1 entry, 1 announced)
 *L2CKT Preference: 7
 Next hop: via so-1/1/2.0 weight 1, selected
 Label-switched-path my-lsp
 Label operation: Push 100000, Push 100000(top)[0] Offset: -4
 Protocol next hop: 10.245.255.63
 Push 100000 Offset: -4
 Indirect next hop: 86af0c0 298
 State: <Active Int>
 Local AS: 99
 Age: 9:52
 Task: Common L2 VC
 Announcement bits (2): 0-KRT 1-Common L2 VC
 AS path: I

```

```

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
 *L2CKT Preference: 7
 Next hop: via so-1/1/2.0 weight 1, selected
 Label-switched-path my-lsp
 Label operation: Push 100000[0]
 Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
 State: <Active Int>
 Local AS: 99
 Age: 10:21
 Task: l2 circuit
 Announcement bits (1): 0-LDP
 AS path: I
 VC Label 100000, MTU 1500, VLAN ID 512

```

### show route protocol l2vpn extensive

```

user@host> show route protocol l2vpn extensive

inet.0: 14 destinations, 15 routes (13 active, 0 holddown, 1 hidden)

inet.3: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
800001 (1 entry, 1 announced)
TSI:
KRT in-kernel 800001 /36 -> {so-0/0/0.0}
 *L2VPN Preference: 7
 Next hop: via so-0/0/0.0 weight 49087 balance 97%, selected
 Label operation: Pop Offset: 4
 State: <Active Int>
 Local AS: 69
 Age: 7:48
 Task: Common L2 VC
 Announcement bits (1): 0-KRT
 AS path: I

so-0/0/0.0 (1 entry, 1 announced)
TSI:
KRT in-kernel so-0/0/0.0 /16 -> {indirect(288)}
 *L2VPN Preference: 7
 Next hop: via so-0/0/1.0, selected
 Label operation: Push 800000 Offset: -4
 Protocol next hop: 10.255.14.220
 Push 800000 Offset: -4
 Indirect next hop: 85142a0 288
 State: <Active Int>
 Local AS: 69
 Age: 7:48
 Task: Common L2 VC
 Announcement bits (2): 0-KRT 1-Common L2 VC
 AS path: I
 Communities: target:69:1 Layer2-info: encaps:PPP,
 control flags:2, mtu: 0

```

### show route protocol ldp

```

user@host> show route protocol ldp

```

```

inet.0: 12 destinations, 13 routes (12 active, 0 holddown, 0 hidden)

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.16.1/32 *[LDP/9] 1d 23:03:35, metric 1
 > via t1-4/0/0.0, Push 100000
192.168.17.1/32 *[LDP/9] 1d 23:03:35, metric 1
 > via t1-4/0/0.0

private1___.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

100064 *[LDP/9] 1d 23:03:35, metric 1
 > via t1-4/0/0.0, Pop
100064(S=0) *[LDP/9] 1d 23:03:35, metric 1
 > via t1-4/0/0.0, Pop
100080 *[LDP/9] 1d 23:03:35, metric 1
 > via t1-4/0/0.0, Swap 100000

```

### show route protocol ldp extensive

```

user@host> show route protocol ldp extensive
192.168.16.1/32 (1 entry, 1 announced)
 State: <FlashAll>
 *LDP Preference: 9
 Next-hop reference count: 3
 Next hop: via t1-4/0/0.0, selected
 Label operation: Push 100000
 State: <Active Int>
 Local AS: 65500
 Age: 1d 23:03:58 Metric: 1
 Task: LDP
 Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
 AS path: I

192.168.17.1/32 (1 entry, 1 announced)
 State: <FlashAll>
 *LDP Preference: 9
 Next-hop reference count: 3
 Next hop: via t1-4/0/0.0, selected
 State: <Active Int>
 Local AS: 65500
 Age: 1d 23:03:58 Metric: 1
 Task: LDP
 Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
 AS path: I

private1___.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)

100064 (1 entry, 1 announced)
TSI:
KRT in-kernel 100064 /36 -> {t1-4/0/0.0}
 *LDP Preference: 9
 Next-hop reference count: 2
 Next hop: via t1-4/0/0.0, selected
 State: <Active Int>

```

```

Local AS: 65500
Age: 1d 23:03:58 Metric: 1
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
Prefixes bound to route: 192.168.17.1/32

100064(S=0) (1 entry, 1 announced)
TSI:
KRT in-kernel 100064 /40 -> {t1-4/0/0.0}
 *LDP Preference: 9
 Next-hop reference count: 2
 Next hop: via t1-4/0/0.0, selected
 Label operation: Pop
 State: <Active Int>
 Local AS: 65500
 Age: 1d 23:03:58 Metric: 1
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I

100080 (1 entry, 1 announced)
TSI:
KRT in-kernel 100080 /36 -> {t1-4/0/0.0}
 *LDP Preference: 9
 Next-hop reference count: 2
 Next hop: via t1-4/0/0.0, selected
 Label operation: Swap 100000
 State: <Active Int>
 Local AS: 65500
 Age: 1d 23:03:58 Metric: 1
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 Prefixes bound to route: 192.168.16.1/32

```

### show route protocol ospf (Layer 3 VPN)

```

user@host> show route protocol ospf
inet.0: 40 destinations, 40 routes (39 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.4/30 *[OSPF/10] 00:05:18, metric 4
 > via t3-3/2/0.0
10.39.1.8/30 [OSPF/10] 00:05:18, metric 2
 > via t3-3/2/0.0
10.255.14.171/32 *[OSPF/10] 00:05:18, metric 4
 > via t3-3/2/0.0
10.255.14.179/32 *[OSPF/10] 00:05:18, metric 2
 > via t3-3/2/0.0
224.0.0.5/32 *[OSPF/10] 20:25:55, metric 1

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30 [OSPF/10] 00:05:43, metric 1
 > via so-0/2/2.0
10.255.14.173/32 *[OSPF/10] 00:05:43, metric 1
 > via so-0/2/2.0
224.0.0.5/32 *[OSPF/10] 20:26:20, metric 1

```

**show route protocol ospf detail**

```

user@host> show route protocol ospf detail
VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30 (2 entries, 0 announced)
 OSPF Preference: 10
 Nexthop: via so-0/2/2.0, selected
 State: <Int>
 Inactive reason: Route Preference
 Age: 6:25 Metric: 1
 Area: 0.0.0.0
 Task: VPN-AB-OSPF
 AS path: I
 Communities: Route-Type:0.0.0.0:1:0

...

```

**show route protocol rip**

```

user@host> show route protocol rip
inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32 * [RIP/100] 20:24:34, metric 2
 > to 10.39.1.22 via t3-0/2/2.0
224.0.0.9/32 * [RIP/100] 00:03:59, metric 1

```

**show route protocol rip detail**

```

user@host> show route protocol rip detail
inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32 (1 entry, 1 announced)
 *RIP Preference: 100
 Nexthop: 10.39.1.22 via t3-0/2/2.0, selected
 State: <Active Int>
 Age: 20:25:02 Metric: 2
 Task: VPN-AB-RIPv2
 Announcement bits (2): 0-KRT 2-BGP.0.0.0.0+179
 AS path: I
 Route learned from 10.39.1.22 expires in 96 seconds

```

**show route protocol ripng table inet6**

```

user@host> show route protocol ripng table inet6
inet6.0: 4215 destinations, 4215 routes (4214 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

1111::1/128 * [RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::2/128 * [RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::3/128 * [RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0

```

```
1111::4/128 *[RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::5/128 *[RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::6/128 *[RIPng/100] 02:13:33, metric 2
 > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
```

## show route range

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 1997</a><br><a href="#">Syntax (EX Series Switches) on page 1997</a>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                      | <pre>show route range &lt;brief   detail   extensive   terse&gt; &lt;destination-prefix&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (EX Series Switches)</b> | <pre>show route range &lt;brief   detail   extensive   terse&gt; &lt;destination-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                 | Display routing table entries using a prefix range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                     | <p><b>none</b>—Display standard information about all routing table entries using a prefix range.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>.</p> <p><b>destination-prefix</b>—Destination and prefix mask for the range.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>       | <a href="#">show route range on page 1997</a><br><a href="#">show route range destination-prefix on page 1998</a><br><a href="#">show route range detail on page 1998</a><br><a href="#">show route range extensive on page 1999</a><br><a href="#">show route range terse on page 2000</a>                                                                                                                                                                                                                             |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                          |

## Sample Output

### show route range

```
user@host> show route range
```

```
inet.0: 11 destinations, 11 routes (10 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
10.10.0.0/16 *[Static/5] 00:30:01
 > to 192.168.71.254 via fxp0.0
10.209.0.0/16 *[Static/5] 00:30:01
```

```
10.255.71.14/32 > to 192.168.71.254 via fxp0.0
 *[Direct/0] 00:30:01
 > via lo0.0
172.16.0.0/12 *[Static/5] 00:30:01
 > to 192.168.71.254 via fxp0.0
192.168.0.0/16 *[Static/5] 00:30:01
 > to 192.168.71.254 via fxp0.0
192.168.64.0/21 *[Direct/0] 00:30:01
 > via fxp0.0
192.168.71.14/32 *[Local/0] 00:30:01
 Local via fxp0.0
192.168.102.0/23 *[Static/5] 00:30:01
 > to 192.168.71.254 via fxp0.0
...
```

### show route range destination-prefix

```
user@host> show route range 192.168.0.0/16

inet.0: 11 destinations, 11 routes (10 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.0.0/16 *[Static/5] 00:31:14
 > to 192.168.71.254 via fxp0.0
192.168.64.0/21 *[Direct/0] 00:31:14
 > via fxp0.0
192.168.71.14/32 *[Local/0] 00:31:14
 Local via fxp0.0
192.168.102.0/23 *[Static/5] 00:31:14
 > to 192.168.71.254 via fxp0.0
```

### show route range detail

```
user@host> show route range detail

inet.0: 11 destinations, 11 routes (10 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 30:05
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

10.209.0.0/16 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 30:05
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

10.255.71.14/32 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
```



```

 State: <Active Int>
 Age: 30:05
 Task: IF
 AS path: I

172.16.0.0/12 (1 entry, 1 announced)
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 30:05
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

...

```

### show route range extensive

```

user@host> show route range extensive

inet.0: 11 destinations, 11 routes (10 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 30:17
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

10.209.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.209.0.0/16 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 22
 Next hop: 192.168.71.254 via fxp0.0, selected
 State: <Active NoReadvrt Int Ext>
 Age: 30:17
 Task: RT
 Announcement bits (1): 0-KRT
 AS path: I

10.255.71.14/32 (1 entry, 0 announced)
 *Direct Preference: 0
 Next hop type: Interface
 Next-hop reference count: 1
 Next hop: via lo0.0, selected
 State: <Active Int>
 Age: 30:17
 Task: IF
 AS path: I

172.16.0.0/12 (1 entry, 1 announced)
TSI:
KRT in-kernel 172.16.0.0/12 -> {192.168.71.254}
 *Static Preference: 5
 Next-hop reference count: 22

```

```

Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Age: 30:17
Task: RT
Announcement bits (1): 0-KRT
AS path: I

```

```
...
```

### show route range terse

```
user@host> show route range terse
```

```
inet.0: 11 destinations, 11 routes (10 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

| A | Destination       | P | Prf | Metric 1 | Metric 2 | Next hop        | AS path |
|---|-------------------|---|-----|----------|----------|-----------------|---------|
| * | 10.10.0.0/16      | S | 5   |          |          | >192.168.71.254 |         |
| * | 10.209.0.0/16     | S | 5   |          |          | >192.168.71.254 |         |
| * | 10.255.71.14/32   | D | 0   |          |          | >lo0.0          |         |
| * | 172.16.0.0/12     | S | 5   |          |          | >192.168.71.254 |         |
| * | 192.168.0.0/16    | S | 5   |          |          | >192.168.71.254 |         |
| * | 192.168.64.0/21   | D | 0   |          |          | >fxp0.0         |         |
| * | 192.168.71.14/32  | L | 0   |          |          | Local           |         |
| * | 192.168.102.0/23  | S | 5   |          |          | >192.168.71.254 |         |
| * | 207.17.136.0/24   | S | 5   |          |          | >192.168.71.254 |         |
| * | 207.17.136.192/32 | S | 5   |          |          | >192.168.71.254 |         |

```

__juniper_private1__.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0
hidden)
+ = Active Route, - = Last Active, * = Both

```

| A | Destination | P | Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---|-------------|---|-----|----------|----------|----------|---------|
| * | 10.0.0.0/8  | D | 0   |          |          | >fxp2.0  |         |
|   |             | D | 0   |          |          | >fxp1.0  |         |
| * | 10.0.0.4/32 | L | 0   |          |          | Local    |         |

```

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

| A | Destination                                         | P | Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---|-----------------------------------------------------|---|-----|----------|----------|----------|---------|
|   | 47.0005.80ff.f800.0000.0108.0001.0102.5507.1014/152 |   |     |          |          |          |         |
| * |                                                     | D | 0   |          |          | >lo0.0   |         |

```

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

| A | Destination                  | P | Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---|------------------------------|---|-----|----------|----------|----------|---------|
|   | abcd::10:255:71:14/128       |   |     |          |          |          |         |
| * |                              | D | 0   |          |          | >lo0.0   |         |
|   | fe80::280:42ff:fe11:226f/128 |   |     |          |          |          |         |
| * |                              | D | 0   |          |          | >lo0.0   |         |

```

__juniper_private1__.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0
hidden)
+ = Active Route, - = Last Active, * = Both

```

| A | Destination                  | P | Prf | Metric 1 | Metric 2 | Next hop   | AS path |
|---|------------------------------|---|-----|----------|----------|------------|---------|
|   | fe80::280:42ff:fe11:226f/128 |   |     |          |          |            |         |
| * |                              | D | 0   |          |          | >lo0.16385 |         |

## show route receive-protocol

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 2001</a><br><a href="#">Syntax (EX Series Switches) on page 2001</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                      | show route receive-protocol <i>protocol neighbor-address</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | show route receive-protocol <i>protocol neighbor-address</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                 | Display the routing information as it was received through a particular neighbor using a particular dynamic routing protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                     | <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>protocol neighbor-address</i></b>—Protocol transmitting the route (<b>bgp</b>, <b>dvmrp</b>, <b>msdp</b>, <b>pim</b>, <b>rip</b>, or <b>ripng</b>) and address of the neighboring router from which the route entry was received.</p>                                                                                                                                                                                                                                                                                                                                                |
| <b>Additional Information</b>      | The output displays the selected routes and the attributes with which they were received, but does not show the effects of import policy on the routing attributes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>       | <a href="#">show route receive-protocol bgp on page 2004</a><br><a href="#">show route receive-protocol bgp extensive on page 2004</a><br><a href="#">show route receive-protocol bgp table extensive on page 2004</a><br><a href="#">show route receive-protocol bgp logical-system extensive on page 2005</a><br><a href="#">show route receive-protocol bgp detail (Layer 2 VPN) on page 2006</a><br><a href="#">show route receive-protocol bgp extensive (Layer 2 VPN) on page 2006</a><br><a href="#">show route receive-protocol bgp (Layer 3 VPN) on page 2007</a><br><a href="#">show route receive-protocol bgp detail (Layer 3 VPN) on page 2007</a><br><a href="#">show route receive-protocol bgp detail (Long-Lived Graceful Restart) on page 2008</a><br><a href="#">show route receive-protocol bgp extensive (Layer 3 VPN) on page 2008</a> |
| <b>Output Fields</b>               | <a href="#">Table 196 on page 2002</a> describes the output fields for the <b>show route receive-protocol</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 196: show route receive-protocol Output Fields

| Field Name                                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output         |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>routing-table-name</i>                       | Name of the routing table—for example, inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels              |
| <i>number destinations</i>                      | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <i>number routes</i>                            | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b></li> <li>• <b>holddown</b> (routes that are in pending state before being declared inactive)</li> <li>• <b>hidden</b> (routes that are not used because of a routing policy)</li> </ul>                                                                                                                                      | All levels              |
| Prefix                                          | Destination prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                           | none <b>brief</b>       |
| MED                                             | Multiple exit discriminator value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                      | none <b>brief</b>       |
| <i>destination-prefix</i><br>(entry, announced) | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Accepted LongLivedStale</b>                  | The LongLivedStale flag indicates that the route was marked LLGR-stale by this router, as part of the operation of LLGR receiver mode. Either this flag or the LongLivedStaleImport flag may be displayed for a route. Neither of these flags are displayed at the same time as the Stale (ordinary GR stale) flag.                                                                                                                                                           | <b>detail extensive</b> |
| <b>Accepted LongLivedStaleImport</b>            | The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy. Either this flag or the LongLivedStale flag may be displayed for a route. Neither of these flags are displayed at the same time as the Stale (ordinary GR stale) flag.<br><br>Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and import into the inet.0 routing table | <b>detail extensive</b> |
| <b>ImportAccepted LongLivedStaleImport</b>      | Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and imported into the inet.0 routing table<br><br>The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy.                                                                                                                                                                      | <b>detail extensive</b> |
| Route Distinguisher                             | 64-bit prefix added to IP subnets to make them unique.                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| Label-Base, range                               | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| VPN Label                                       | Virtual private network (VPN) label. Packets are sent between CE and PE routing devices by advertising VPN labels. VPN labels transit over either an RSVP or an LDP label-switched path (LSP) tunnel.                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |

Table 196: show route receive-protocol Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Next hop             | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All levels       |
| Localpref or Lclpref | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels       |
| AS path              | <p>Autonomous system (AS) path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the number that precedes the AS path. This number represents the number of ASs present in the AS path, when calculated as defined in RFC 4271. This value is used the AS-path merge process, as defined in RFC 4893.</li> <li>• <b>[ ]</b>—If more than one AS number is configured on the router, or if AS path prepending is configured, brackets enclose the local AS number associated with the AS path.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels       |
| Cluster list         | (For route reflected output only) Cluster ID sent by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive |
| Originator ID        | (For route reflected output only) Address of routing device that originally sent the route to the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | detail extensive |
| Communities          | Community path attribute for the route. See the Output Field table in the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |
| AIGP                 | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |
| Attrset AS           | Number, local preference, and path of the AS that originated the route. These values are stored in the <b>Attrset</b> attribute at the originating routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | detail extensive |
| Layer2-info: encaps  | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive |
| control flags        | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |

Table 196: show route receive-protocol Output Fields (*continued*)

| Field Name | Field Description                                       | Level of Output  |
|------------|---------------------------------------------------------|------------------|
| mtu        | Maximum transmission unit (MTU) of the Layer 2 circuit. | detail extensive |

## Sample Output

### show route receive-protocol bgp

```

user@host> show route receive-protocol bgp 10.255.245.215

inet.0: 28 destinations, 33 routes (27 active, 0 holddown, 1 hidden)
Prefix Next hop MED Lclpref AS path
10.22.1.0/24 10.255.245.215 0 100 I
10.22.2.0/24 10.255.245.215 0 100 I

```

### show route receive-protocol bgp extensive

```

user@host> show route receive-protocol bgp 10.255.245.63 extensive
inet.0: 244 destinations, 244 routes (243 active, 0 holddown, 1 hidden)
Prefix Next hop MED Lclpref AS path
1.1.1.0/24 (1 entry, 1 announced)
 Next hop: 10.0.50.3
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.45
165.3.0.0/16 (1 entry, 1 announced)
 Next hop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.68
165.4.0.0/16 (1 entry, 1 announced)
 Next hop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.45
195.1.2.0/24 (1 entry, 1 announced)
 Next hop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.68
inet.2: 63 destinations, 63 routes (63 active, 0 holddown, 0 hidden)
Prefix Next hop MED Lclpref AS path
inet.3: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix Next hop MED Lclpref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Next hop MED Lclpref AS path
mpls.0: 48 destinations, 48 routes (48 active, 0 holddown, 0 hidden)

```

### show route receive-protocol bgp table extensive

```

user@host> show route receive-protocol bgp 207.17.136.192 table inet.0 66.117.68.0/24 extensive
inet.0: 227315 destinations, 227316 routes (227302 active, 0 holddown, 13 hidden)
* 66.117.63.0/24 (1 entry, 1 announced)
 Nexthop: 207.17.136.29

```

```

Localpref: 100
AS path: AS2 PA[6]: 14203 2914 3356 29748 33437 AS_TRANS
AS path: AS4 PA[2]: 33437 393219
AS path: Merged[6]: 14203 2914 3356 29748 33437 393219 I
Communities: 2914:420

```

### show route receive-protocol bgp logical-system extensive

```

user@host> show route receive-protocol bgp 10.0.0.9 logical-system PE4 extensive
inet.0: 12 destinations, 13 routes (12 active, 0 holddown, 0 hidden)
* 10.0.0.0/30 (1 entry, 1 announced)
 Accepted
 Route Label: 3
 Nexthop: 10.0.0.9
 AS path: 13979 I

* 10.0.0.4/30 (1 entry, 1 announced)
 Accepted
 Route Label: 3
 Nexthop: 10.0.0.9
 AS path: 13979 I

10.0.0.8/30 (2 entries, 1 announced)
 Accepted
 Route Label: 3
 Nexthop: 10.0.0.9
 AS path: 13979 I

* 10.9.9.1/32 (1 entry, 1 announced)
 Accepted
 Route Label: 3
 Nexthop: 10.0.0.9
 AS path: 13979 I

* 10.100.1.1/32 (1 entry, 1 announced)
 Accepted
 Route Label: 3
 Nexthop: 10.0.0.9
 AS path: 13979 I

* 44.0.0.0/24 (1 entry, 1 announced)
 Accepted
 Route Label: 300096
 Nexthop: 10.0.0.9
 AS path: 13979 I
 AIGP: 203

* 55.0.0.0/24 (1 entry, 1 announced)
 Accepted
 Route Label: 300112
 Nexthop: 10.0.0.9
 AS path: 13979 7018 I
 AIGP: 25

* 66.0.0.0/24 (1 entry, 1 announced)
 Accepted
 Route Label: 300144
 Nexthop: 10.0.0.9
 AS path: 13979 7018 I

* 99.0.0.0/24 (1 entry, 1 announced)

```

```
Accepted
Route Label: 300160
NextHop: 10.0.0.9
AS path: 13979 7018 I
```

### show route receive-protocol bgp detail (Layer 2 VPN)

```
user@host> show route receive-protocol bgp 10.255.14.171 detail
inet.0: 68 destinations, 68 routes (67 active, 0 holddown, 1 hidden)
Prefix Nexthop MED Lclpref AS path
inet.3: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
mpls.0: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
frame-vpn.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0
hidden)
Prefix Nexthop MED Lclpref AS path
10.255.245.35:1:5:1/96 (1 entry, 1 announced)
 Route Distinguisher: 10.255.245.35:1
 Label-base : 800000, range : 4, status-vector : 0x0
 Nexthop: 10.255.245.35
 Localpref: 100
 AS path: I
 Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
 control flags: 0, mtu: 0
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.245.35:1:5:1/96 (1 entry, 0 announced)
 Route Distinguisher: 10.255.245.35:1
 Label-base : 800000, range : 4, status-vector : 0x0
 Nexthop: 10.255.245.35
 Localpref: 100
 AS path: I
 Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
 control flags: 0, mtu: 0
```

### show route receive-protocol bgp extensive (Layer 2 VPN)

```
user@host> show route receive-protocol bgp 10.255.14.171 extensive
inet.0: 68 destinations, 68 routes (67 active, 0 holddown, 1 hidden)
Prefix Nexthop MED Lclpref AS path
inet.3: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
mpls.0: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
frame-vpn.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.245.35:1:5:1/96 (1 entry, 1 announced)
 Route Distinguisher: 10.255.245.35:1
 Label-base : 800000, range : 4, status-vector : 0x0
 Nexthop: 10.255.245.35
 Localpref: 100
 AS path: I
 Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
 control flags: 0, mtu: 0
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
```



```

10.255.245.35:1:5:1/96 (1 entry, 0 announced)
 Route Distinguisher: 10.255.245.35:1
 Label-base : 800000, range : 4, status-vector : 0x0
 Nexthop: 10.255.245.35
 Localpref: 100
 AS path: I
 Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
 control flags:0, mtu: 0

```

### show route receive-protocol bgp (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.14.171
inet.0: 33 destinations, 33 routes (32 active, 0 holddown, 1 hidden)
Prefix Nexthop MED Lclpref AS path
inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
VPN-A.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.14.175/32 10.255.14.171 100 2 I
10.255.14.179/32 10.255.14.171 2 100 I
VPN-B.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.14.175/32 10.255.14.171 100 2 I
10.255.14.177/32 10.255.14.171 100 I
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
mpls.0: 9 destinations, 9 routes (9 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
bgp.l3vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
10.255.14.171:300:10.255.14.177/32
 10.255.14.171 100 I
10.255.14.171:100:10.255.14.179/32
 10.255.14.171 2 100 I
10.255.14.171:200:10.255.14.175/32
 10.255.14.171 100 2 I

```

### show route receive-protocol bgp detail (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.14.174 detail
inet.0: 16 destinations, 17 routes (15 active, 0 holddown, 1 hidden)
inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
vpna.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
* 10.49.0.0/30 (1 entry, 1 announced)
 Route Distinguisher: 10.255.14.176:2
 VPN Label: 101264
 Nexthop: 10.255.14.174
 Localpref: 100
 AS path: I
 Communities: target:200:100
 AttrSet AS: 100
 Localpref: 100
 AS path: I
* 10.255.14.172/32 (1 entry, 1 announced)
 Route Distinguisher: 10.255.14.176:2
 VPN Label: 101280
 Nexthop: 10.255.14.174
 Localpref: 100
 AS path: I
 Communities: target:200:100
 AttrSet AS: 100

```

```

 Localpref: 100
 AS path: I
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
bgp.l3vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
* 10.255.14.174:2:10.49.0.0/30 (1 entry, 0 announced)
 Route Distinguisher: 10.255.14.174:2
 VPN Label: 101264
 Nexthop: 10.255.14.174
 Localpref: 100
 AS path: I
 Communities: target:200:100
 AttrSet AS: 100
 Localpref: 100
 AS path: I
* 10.255.14.174:2:10.255.14.172/32 (1 entry, 0 announced)
 Route Distinguisher: 10.255.14.174:2
 VPN Label: 101280
 Nexthop: 10.255.14.174
 Localpref: 100
 AS path: I
 Communities: target:200:100
 AttrSet AS: 100
 Localpref: 100
 AS path: I
inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

```

#### show route receive-protocol bgp detail (Long-Lived Graceful Restart)

```

user@host> show route receive-protocol bgp 10.4.12.11 detail

bgp.l2vpn.0: 38 destinations, 39 routes (37 active, 0 holddown, 1 hidden)
* 1.1.1.4:100:1.1.1.4/96 AD (1 entry, 1 announced)
 Accepted LongLivedStale LongLivedStaleImport
 Nexthop: 10.4.12.11
 Localpref: 100
 AS path: I

```

#### show route receive-protocol bgp extensive (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.245.63 extensive
inet.0: 244 destinations, 244 routes (243 active, 0 holddown, 1 hidden)
 Prefix Nexthop MED Lclpref AS path
 1.1.1.0/24 (1 entry, 1 announced)
 Nexthop: 10.0.50.3
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.45
 165.3.0.0/16 (1 entry, 1 announced)
 Nexthop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.68
 165.4.0.0/16 (1 entry, 1 announced)
 Nexthop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.45

```

```
195.1.2.0/24 (1 entry, 1 announced)
 Nexthop: 111.222.5.254
 Localpref: 100
 AS path: I <Originator>
 Cluster list: 10.2.3.1
 Originator ID: 10.255.245.68
inet.2: 63 destinations, 63 routes (63 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
inet.3: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
mpls.0: 48 destinations, 48 routes (48 active, 0 holddown, 0 hidden)
```

## show route resolution

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax              | <a href="#">Syntax on page 2010</a><br><a href="#">Syntax (EX Series Switches) on page 2010</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Syntax                      | <pre>show route resolution &lt;brief   detail   extensive   summary&gt; &lt;index <i>index</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;prefix&gt; &lt;table <i>routing-table-name</i>&gt; &lt;unresolved&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Syntax (EX Series Switches) | <pre>show route resolution &lt;brief   detail   extensive   summary&gt; &lt;index <i>index</i>&gt; &lt;prefix&gt; &lt;table <i>routing-table-name</i>&gt; &lt;unresolved&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Release Information         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description                 | Display the entries in the next-hop resolution database. This database provides for recursive resolution of next hops through other prefixes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Options                     | <p><b>none</b>—Display standard information about all entries in the next-hop resolution database.</p> <p><b>brief   detail   extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>index <i>index</i></b>—(Optional) Show the index of the resolution tree.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>prefix <i>network/destination-prefix</i></b>—(Optional) Display database entries for the specified address.</p> <p><b>table <i>routing-table-name</i></b>—(Optional) Display information about a particular routing table (for example, <b>inet.0</b>) where policy-based export is currently enabled.</p> <p><b>unresolved</b>—(Optional) Display routes that could not be resolved.</p> |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Related Documentation       | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring Route Resolution on PE Routers</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| List of Sample Output       | <a href="#">show route resolution detail on page 2011</a><br><a href="#">show route resolution summary on page 2012</a><br><a href="#">show route resolution unresolved on page 2012</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Output Fields** Table 197 on page 2011 describes the output fields for the **show route resolution** command. Output fields are listed in the approximate order in which they appear.

**Table 197: show route resolution Output Fields**

| Field Name                         | Field Description                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>          | Name of the routing table whose prefixes are resolved using the entries in the route resolution database. For routing table groups, this is the name of the primary routing table whose prefixes are resolved using the entries in the route resolution database.                                                                                     |
| <b>Tree index</b>                  | Tree index identifier.                                                                                                                                                                                                                                                                                                                                |
| <b>Nodes</b>                       | Number of nodes in the tree.                                                                                                                                                                                                                                                                                                                          |
| <b>Reference count</b>             | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                            |
| <b>Contributing routing tables</b> | Routing tables used for next-hop resolution.                                                                                                                                                                                                                                                                                                          |
| <b>Originating RIB</b>             | Name of the routing table whose active route was used to determine the forwarding next-hop entry in the resolution database. For example, in the case of <b>inet.0</b> resolving through <b>inet.0</b> and <b>inet.3</b> , this field indicates which routing table, <b>inet.0</b> or <b>inet.3</b> , provided the best path for a particular prefix. |
| <b>Metric</b>                      | Metric associated with the forwarding next hop.                                                                                                                                                                                                                                                                                                       |
| <b>Node path count</b>             | Number of nodes in the path.                                                                                                                                                                                                                                                                                                                          |
| <b>Forwarding next hops</b>        | Number of forwarding next hops. The forwarding next hop is the network layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.                                                                                                                                                                 |

## Sample Output

### show route resolution detail

```

user@host> show route resolution detail
Tree Index: 1, Nodes 0, Reference Count 1
Contributing routing tables: inet.3
Tree Index: 2, Nodes 23, Reference Count 1
Contributing routing tables: inet.0 inet.3
10.10.0.0/16 Originating RIB: inet.0
 Node path count: 1
 Forwarding nexthops: 1
10.31.1.0/30 Originating RIB: inet.0
 Node path count: 1
 Forwarding nexthops: 1
10.31.1.1/32 Originating RIB: inet.0
 Node path count: 1
 Forwarding nexthops: 0
10.31.1.4/30 Originating RIB: inet.0
 Node path count: 1
 Forwarding nexthops: 1
10.31.1.5/32 Originating RIB: inet.0

```

```

Node path count: 1
Forwarding nexthops: 0
10.31.2.0/30 Originating RIB: inet.0
Metric: 2 Node path count: 1
Forwarding nexthops: 2
10.31.11.0/24 Originating RIB: inet.0
Node path count: 1
Forwarding nexthops: 1

```

#### show route resolution summary

```

user@host> show route resolution summary
Tree Index: 1, Nodes 24, Reference Count 1
Contributing routing tables: :voice.inet.0 :voice.inet.3
Tree Index: 2, Nodes 2, Reference Count 1
Contributing routing tables: inet.3
Tree Index: 3, Nodes 43, Reference Count 1
Contributing routing tables: inet.0 inet.3

```

#### show route resolution unresolved

```

user@host> show route resolution unresolved
Tree Index 1
vt-3/2/0.32769.0 /16
 Protocol Nexthop: 10.255.71.238 Push 800000
 Indirect nexthop: 0 -
vt-3/2/0.32772.0 /16
 Protocol Nexthop: 10.255.70.103 Push 800008
 Indirect nexthop: 0 -
Tree Index 2

```

## show route snooping

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show route snooping &lt;brief   detail   extensive   terse&gt; &lt;all&gt; &lt;best address/prefix&gt; &lt;exact address&gt; &lt;logical-system logical-system-name&gt; &lt;range prefix-range&gt; &lt;summary&gt; &lt;table table-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 8.5.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Display the entries in the routing table that were learned from snooping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>none</b>—Display the entries in the routing table that were learned from snooping.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>.</p> <p><b>all</b>—(Optional) Display all entries, including hidden entries.</p> <p><b>best address/prefix</b>—(Optional) Display the longest match for the provided address and optional prefix.</p> <p><b>exact address/prefix</b>—(Optional) Display exact matches for the provided address and optional prefix.</p> <p><b>logical-system logical-system-name</b>—(Optional) Display information about a particular logical system, or type 'all'.</p> <p><b>range prefix-range</b>—(Optional) Display information for the provided address range.</p> <p><b>summary</b>—(Optional) Display route snooping summary statistics.</p> <p><b>table table-name</b>—(Optional) Display information for the named table.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <p><a href="#">show route snooping detail on page 2013</a></p> <p><a href="#">show route snooping logical-system all on page 2014</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### show route snooping detail

```
user@host> show route snooping detail
```

```

__+domainAll__.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

224.0.0.2/32 (1 entry, 1 announced)
 *IGMP Preference: 0
 Next hop type: MultiRecv
 Next-hop reference count: 4
 State: <Active NoReadvrt Int>
 Age: 2:24
 Task: IGMP
 Announcement bits (1): 0-KRT
 AS path: I

224.0.0.22/32 (1 entry, 1 announced)
 *IGMP Preference: 0
 Next hop type: MultiRecv
 Next-hop reference count: 4
 State: <Active NoReadvrt Int>
 Age: 2:24
 Task: IGMP
 Announcement bits (1): 0-KRT
 AS path: I

__+domainAll__.inet.1: 36 destinations, 36 routes (36 active, 0 holddown, 0 hidden)

224.0.0.0.0.0.0.0/24 (1 entry, 1 announced)
 *Multicast Preference: 180
 Next hop type: Multicast (IPv4), Next hop index: 1048584
 Next-hop reference count: 4
 State: <Active Int>
 Age: 2:24
 Task: MC
 Announcement bits (1): 0-KRT
 AS path: I

<snip>

```

#### show route snooping logical-system all

```

user@host> show route snooping logical-system all

logical-system: default

inet.1: 20 destinations, 20 routes (20 active, 0 holddown, 0 hidden)
Restart Unsupported
+ = Active Route, - = Last Active, * = Both

0.0,0.1,0.0,232.1.1.65,100.1.1.2/112*[Multicast/180] 00:07:36
 Multicast (IPv4) Composite
0.0,0.1,0.0,232.1.1.66,100.1.1.2/112*[Multicast/180] 00:07:36
 Multicast (IPv4) Composite
0.0,0.1,0.0,232.1.1.67,100.1.1.2/112*[Multicast/180] 00:07:36

<snip>

default-switch.inet.1: 237 dest, 237 rts (237 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

0.15,0.1,0.0,0.0.0.0,0.0.0.0,2/120*[Multicast/180] 00:08:21
 Multicast (IPv4) Composite
0.15,0.1,0.0,0.0.0.0,0.0.0.0,2,17/128*[Multicast/180] 00:08:21

```



### Multicast (IPv4) Composite

<snip>

## show route source-gateway

---

|                             |                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax              | <a href="#">Syntax on page 2016</a><br><a href="#">Syntax (EX Series Switches) on page 2016</a>                                                                                                                                                                                                                                                                                           |
| Syntax                      | <code>show route source-gateway address</code><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                            |
| Syntax (EX Series Switches) | <code>show route source-gateway address</code><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                    |
| Release Information         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                     |
| Description                 | Display the entries in the routing table that were learned from a particular address. The <b>Source</b> field in the <code>show route detail</code> command output lists the source for each route, if known.                                                                                                                                                                             |
| Options                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b>address</b> —IP address of the system.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| Required Privilege Level    | view                                                                                                                                                                                                                                                                                                                                                                                      |
| List of Sample Output       | <a href="#">show route source-gateway on page 2016</a><br><a href="#">show route source-gateway detail on page 2017</a><br><a href="#">show route source-gateway extensive on page 2019</a>                                                                                                                                                                                               |
| Output Fields               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                            |

## Sample Output

### show route source-gateway

```
user@host> show route source-gateway 10.255.70.103
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete
```

```

mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.255.70.103:1:3:1/96
 *[BGP/170] 12:12:24, localpref 100, from 10.255.70.103
 AS path: I
 > via so-0/3/0.0, label-switched-path green-r1-r3

red.l2vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.255.70.103:2:3:1/96
 *[BGP/170] 12:12:24, localpref 0, from 10.255.70.103
 AS path: I
 > via so-0/3/0.0, label-switched-path green-r1-r3

bgp.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.255.70.103:1:3:1/96
 *[BGP/170] 12:12:24, localpref 100, from 10.255.70.103
 AS path: I
 > via so-0/3/0.0, label-switched-path green-r1-r3

10.255.70.103:2:3:1/96
 *[BGP/170] 12:12:24, localpref 0, from 10.255.70.103
 AS path: I
 > via so-0/3/0.0, label-switched-path green-r1-r3

```

#### show route source-gateway detail

```

user@host> show route source-gateway 10.255.70.103 detail
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
Restart Complete
green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

```

```

Restart Complete
10.255.70.103:1:3:1/96 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.70.103:1
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Secondary Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 12:14:00 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 Announcement bits (1): 0-green-12vpn
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0
 Label-base: 800008, range: 8
 Localpref: 100
 Router ID: 10.255.70.103
 Primary Routing Table bgp.12vpn.0

red.12vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Restart Complete

10.255.70.103:2:3:1/96 (1 entry, 1 announced)
 *BGP Preference: 170/-1
 Route Distinguisher: 10.255.70.103:2
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Secondary Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 12:14:00 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 Announcement bits (1): 0-red-12vpn
 AS path: I
 Communities: target:11111:2 Layer2-info: encaps:VPLS,
 control flags:Site-Down, mtu: 0
 Label-base: 800016, range: 8
 Localpref: 0
 Router ID: 10.255.70.103
 Primary Routing Table bgp.12vpn.0

bgp.12vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

10.255.70.103:1:3:1/96 (1 entry, 0 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.70.103:1
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 12:14:00 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS, control
 flags:, mtu: 0

```

```

Label-base: 800008, range: 8
Localpref: 100
Router ID: 10.255.70.103
Secondary Tables: green.l2vpn.0
10.255.70.103:2:3:1/96 (1 entry, 0 announced)
 *BGP Preference: 170/-1
 Route Distinguisher: 10.255.70.103:2
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 12:14:00 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 AS path: I
 Communities: target:11111:2 Layer2-info: encaps:VPLS,
 control flags:Site-Down,
 mtu: 0
 Label-base: 800016, range: 8
 Localpref: 0
 Router ID: 10.255.70.103
 Secondary Tables: red.l2vpn.0

```

#### show route source-gateway extensive

```

user@host> show route source-gateway 10.255.70.103 extensive
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
Restart Complete

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
10.255.70.103:1:3:1/96 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.70.103:1
 Next-hop reference count: 7
 Source: 10.255.70.103
 Protocol next hop: 10.255.70.103
 Indirect next hop: 2 no-forward
 State: <Secondary Active Int Ext>
 Local AS: 69 Peer AS: 69
 Age: 12:15:24 Metric2: 1
 Task: BGP_69.10.255.70.103+179
 Announcement bits (1): 0-green-l2vpn
 AS path: I
 Communities: target:11111:1 Layer2-info: encaps:VPLS,
 control flags:, mtu: 0

```

```

Label-base: 800008, range: 8
Localpref: 100
Router ID: 10.255.70.103
Primary Routing Table bgp.l2vpn.0

red.l2vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Restart Complete

10.255.70.103:2:3:1/96 (1 entry, 1 announced)
*BGP Preference: 170/-1
Route Distinguisher: 10.255.70.103:2
Next-hop reference count: 7
Source: 10.255.70.103
Protocol next hop: 10.255.70.103
Indirect next hop: 2 no-forward
State: <Secondary Active Int Ext>
Local AS: 69 Peer AS: 69
Age: 12:15:24 Metric2: 1
Task: BGP_69.10.255.70.103+179
Announcement bits (1): 0-red-l2vpn
AS path: I
Communities: target:11111:2 Layer2-info: encaps:VPLS,
control flags:Site-Down, mtu: 0
Label-base: 800016, range: 8
Localpref: 0
Router ID: 10.255.70.103
Primary Routing Table bgp.l2vpn.0

bgp.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

10.255.70.103:1:3:1/96 (1 entry, 0 announced)
*BGP Preference: 170/-101
Route Distinguisher: 10.255.70.103:1
Next-hop reference count: 7
Source: 10.255.70.103
Protocol next hop: 10.255.70.103
Indirect next hop: 2 no-forward
State: <Active Int Ext>
Local AS: 69 Peer AS: 69
Age: 12:15:24 Metric2: 1
Task: BGP_69.10.255.70.103+179
AS path: I
Communities: target:11111:1 Layer2-info: encaps:VPLS,
control flags:, mtu: 0
Label-base: 800008, range: 8
Localpref: 100
Router ID: 10.255.70.103
Secondary Tables: green.l2vpn.0
Indirect next hops: 1
 Protocol next hop: 10.255.70.103 Metric: 2
 Indirect next hop: 2 no-forward
 Indirect path forwarding next hops: 1
Next hop: via so-0/3/0.0 weight 0x1
 10.255.70.103/32 Originating RIB: inet.3
 Metric: 2 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: via so-0/3/0.0

10.255.70.103:2:3:1/96 (1 entry, 0 announced)
*BGP Preference: 170/-1

```

```
Route Distinguisher: 10.255.70.103:2
Next-hop reference count: 7
Source: 10.255.70.103
Protocol next hop: 10.255.70.103
Indirect next hop: 2 no-forward
State: <Active Int Ext>
Local AS: 69 Peer AS: 69
Age: 12:15:24 Metric2: 1
Task: BGP_69.10.255.70.103+179
AS path: I
Communities: target:11111:2 Layer2-info: encaps:VPLS,
control flags:Site-Down,
mtu: 0
Label-base: 800016, range: 8
Localpref: 0
Router ID: 10.255.70.103
Secondary Tables: red.12vpn.0
Indirect next hops: 1
 Protocol next hop: 10.255.70.103 Metric: 2
 Indirect next hop: 2 no-forward
 Indirect path forwarding next hops: 1
Next hop: via so-0/3/0.0 weight 0x1
 10.255.70.103/32 Originating RIB: inet.3
 Metric: 2 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: via so-0/3/0.0
```

## show route summary

---

**List of Syntax**    [Syntax on page 2022](#)  
                         [Syntax \(EX Series Switches\) on page 2022](#)

**Syntax**    show route summary  
              <logical-system (all | *logical-system-name*)>  
              <table *routing-table-name*>

**Syntax (EX Series Switches)**    show route summary

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.

**Description**    Display summary statistics about the entries in the routing table.

CPU utilization might increase while the device learns routes. We recommend that you use the **show route summary** command after the device learns and enters the routes into the routing table. Depending on the size of your network, this might take several minutes. If you receive a “timeout communicating with routing daemon” error when using the **show route summary** command, wait several minutes before attempting to use the command again. This is not a critical system error, but you might experience a delay in using the command-line interface (CLI).

**Options**    none—Display summary statistics about the entries in the routing table.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**table *routing-table-name***—(Optional) Display summary statistics for all routing tables whose name begins with this string (for example, **inet.0** and **inet6.0** are both displayed when you run the **show route summary table inet** command). If you only want to display statistics for a specific routing table, make sure to enter the exact name of that routing table.

**Required Privilege Level**    view

**List of Sample Output**    [show route summary on page 2024](#)  
                                  [show route summary table on page 2024](#)  
                                  [show route summary table \(with Route Limits Configured for the Routing Table\) on page 2025](#)

**Output Fields**    [Table 198 on page 2022](#) lists the output fields for the **show route summary** command. Output fields are listed in the approximate order in which they appear.

**Table 198: show route summary Output Fields**

| Field Name | Field Description                    |
|------------|--------------------------------------|
| Router ID  | Address of the local routing device. |

---



Table 198: show route summary Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i> | Name of the routing table (for example, <b>inet.0</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>destinations</b>       | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>routes</b>             | <p>Number of routes in the routing table:</p> <ul style="list-style-type: none"> <li>• <b>active</b>—Number of routes that are active.</li> <li>• <b>holddown</b>—Number of routes that are in the hold-down state before being declared inactive.</li> <li>• <b>hidden</b>—Number of routes that are not used because of routing policy.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Restart complete          | <p>All protocols have restarted for this routing table.</p> <p>Restart state:</p> <ul style="list-style-type: none"> <li>• <b>Pending:protocol-name</b>—List of protocols that have not yet completed graceful restart for this routing table.</li> <li>• <b>Complete</b>—All protocols have restarted for this routing table.</li> </ul> <p>For example, if the output shows-</p> <ul style="list-style-type: none"> <li>• <b>LDP.inet.0: 5 routes (4 active, 1 holddown, 0 hidden)</b><br/>Restart Pending: OSPF LDP VPN</li> </ul> <p>This indicates that <b>OSPF</b>, <b>LDP</b>, and <b>VPN</b> protocols did not restart for <b>LDP.inet.0</b> routing table.</p> <ul style="list-style-type: none"> <li>• <b>vpls_1.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)</b><br/>Restart Complete</li> </ul> <p>This indicates that all protocols have restarted for <b>vpls_1.l2vpn.0</b> routing table.</p> |
| <b>Limit/Threshold</b>    | <p>Displays the configured route limits for the routing table set with the <i>maximum-prefixes</i> and the <i>maximum-paths</i> statements. If you do not configure route limits for the routing table, the show output does not display this information.</p> <ul style="list-style-type: none"> <li>• <b>destinations</b>—The first number represents the maximum number of route prefixes installed in the routing table. The second number represents the number of route prefixes that trigger a warning message.</li> <li>• <b>routes</b>—The first number represents the maximum number of routes. The second number represents the number of routes that trigger a warning message.</li> </ul>                                                                                                                                                                                                                             |
| <b>Direct</b>             | Routes on the directly connected network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Local</b>              | Local routes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>protocol-name</i>      | Name of the protocol from which the route was learned. For example, <b>OSPF</b> , <b>RSVP</b> , and <b>Static</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Sample Output

### show route summary

```
user@host> show route summary
Autonomous system number: 69
Router ID: 10.255.71.52
Maximum-ECMP: 32
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
 Direct: 6 routes, 5 active
 Local: 4 routes, 4 active
 OSPF: 5 routes, 4 active
 Static: 7 routes, 7 active
 IGMP: 1 routes, 1 active
 PIM: 2 routes, 2 active

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
 RSVP: 2 routes, 2 active

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete
 Direct: 1 routes, 1 active

mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete
 MPLS: 3 routes, 3 active
 VPLS: 4 routes, 2 active

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
Restart Complete
 Direct: 2 routes, 2 active
 PIM: 2 routes, 2 active
 MLD: 1 routes, 1 active

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
 BGP: 2 routes, 2 active
 L2VPN: 2 routes, 2 active

red.l2vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Restart Complete
 BGP: 2 routes, 2 active
 L2VPN: 1 routes, 1 active

bgp.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
 BGP: 4 routes, 4 active
```

### show route summary table

```
user@host> show route summary table inet
Router ID: 192.168.0.1

inet.0: 32 destinations, 34 routes (31 active, 0 holddown, 1 hidden)
 Direct: 6 routes, 5 active
 Local: 9 routes, 9 active
 OSPF: 3 routes, 1 active
 Static: 13 routes, 13 active
 IGMP: 1 routes, 1 active
```

```

PIM: 2 routes, 2 active

inet.1: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Multicast: 1 routes, 1 active

inet6.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Local: 1 routes, 1 active
PIM: 2 routes, 2 active

inet6.1: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Multicast: 1 routes, 1 active
```

#### show route summary table (with Route Limits Configured for the Routing Table)

```

user@host> show route summary table VPN-A.inet.0
Autonomous system number: 100
Router ID: 10.255.182.142

VPN-A.inet.0: 13 destinations, 14 routes (13 active, 0 holddown, 0 hidden)
Limit/Threshold: 2000/200 destinations 20/12 routes
Direct: 2 routes, 2 active
Local: 1 routes, 1 active
OSPF: 4 routes, 3 active
BGP: 4 routes, 4 active
IGMP: 1 routes, 1 active
PIM: 2 routes, 2 active
```

## show route table

---

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                                      | <a href="#">Syntax on page 2026</a><br><a href="#">Syntax (EX Series Switches and QFX Series Switches) on page 2026</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>                                              | <code>show route table <i>routing-table-name</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switches and QFX Series Switches)</b> | <code>show route table <i>routing-table-name</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>                                 | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 14.1X53-D15 for QFX Series switches.<br>Show route table evpn statement introduced in Junos OS Release 15.1X53-D30 for QFX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                         | Display the route entries in a particular routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                                             | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>routing-table-name</i></b> —Display route entries for all routing tables whose name begins with this string (for example, inet.0 and inet6.0 are both displayed when you run the <b>show route table inet</b> command).                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b>                            | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>                               | <ul style="list-style-type: none"><li>• <a href="#">show route summary on page 2022</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                               | <a href="#">show route table bgp.l2.vpn on page 2037</a><br><a href="#">show route table bgp.l3vpn.0 on page 2037</a><br><a href="#">show route table bgp.l3vpn.0 detail on page 2037</a><br><a href="#">show route table bgp.rtarget.0 (When Proxy BGP Route Target Filtering Is Configured) on page 2038</a><br><a href="#">show route table bgp.evpn.0 on page 2039</a><br><a href="#">show route table evpna.evpn.0 on page 2039</a><br><a href="#">show route table inet.0 on page 2039</a><br><a href="#">show route table inet.3 on page 2040</a><br><a href="#">show route table inet6.0 on page 2040</a><br><a href="#">show route table inet6.3 on page 2040</a><br><a href="#">show route table inetflow detail on page 2041</a><br><a href="#">show route table l2circuit.0 on page 2041</a><br><a href="#">show route table mpls on page 2041</a><br><a href="#">show route table mpls extensive on page 2042</a> |

[show route table mpls.0 on page 2042](#)  
[show route table mpls.0 detail \(PTX Series\) on page 2042](#)  
[show route table mpls.0 extensive \(PTX Series\) on page 2043](#)  
[show route table mpls.0 \(RSVP Route—Transit LSP\) on page 2044](#)  
[show route table vpls\\_1 detail on page 2044](#)  
[show route table vpn-a on page 2044](#)  
[show route table vpn-a.mdt.0 on page 2045](#)  
[show route table VPN-A detail on page 2045](#)  
[show route table VPN-AB.inet.0 on page 2046](#)  
[show route table VPN\\_blue.mvpn-inet6.0 on page 2046](#)  
[show route table vrf1.mvpn.0 extensive on page 2046](#)  
[show route table MVPN.mvpn.0 on page 2047](#)  
[show route table inetflow detail on page 2047](#)  
[show route table bgp.evpn.0 extensive |no-more \(EVPN\) on page 2050](#)

**Output Fields** [Table 180 on page 1853](#) describes the output fields for the **show route table** command. Output fields are listed in the approximate order in which they appear.

**Table 199: show route table Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Restart complete           | <p>All protocols have restarted for this routing table.</p> <p>Restart state:</p> <ul style="list-style-type: none"> <li>• <b>Pending:</b><i>protocol-name</i>—List of protocols that have not yet completed graceful restart for this routing table.</li> <li>• <b>Complete</b>—All protocols have restarted for this routing table.</li> </ul> <p>For example, if the output shows-</p> <ul style="list-style-type: none"> <li>• LDP.inet.0 : 5 routes (4 active, 1 holddown, 0 hidden)<br/>Restart Pending: OSPF LDP VPN</li> </ul> <p>This indicates that <b>OSPF</b>, <b>LDP</b>, and <b>VPN</b> protocols did not restart for <b>LDP.inet.0</b> routing table.</p> <ul style="list-style-type: none"> <li>• vpls_1.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)<br/>Restart Complete</li> </ul> <p>This indicates that all protocols have restarted for <b>vpls_1.l2vpn.0</b> routing table.</p> |
| <i>number</i> destinations | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>number</i> routes       | <p>Number of routes in the routing table and total number of routes in the following states:</p> <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active)</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li>• <b>hidden</b> (routes that are not used because of a routing policy)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 199: show route table Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>route-destination</i><br>(entry, announced) | <p>Route destination (for example:10.0.0.1/24). The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96). <ul style="list-style-type: none"> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> </li> <li>• <b>inclusive multicast Ethernet tag route</b>—Type of route destination represented by (for example, 3:100.100.100.10:100::0::10::100.100.100.10/384): <ul style="list-style-type: none"> <li>• <b>route distinguisher</b>—(8 octets) Route distinguisher (RD) must be the RD of the EVPN instance (EVI) that is advertising the NLRI.</li> <li>• <b>Ethernet tag ID</b>—(4 octets) Identifier of the Ethernet tag. Can set to 0 or to a valid Ethernet tag value.</li> <li>• <b>IP address length</b>—(1 octet) Length of IP address in bits.</li> <li>• <b>originating router's IP address</b>—(4 or 16 octets) Must set to the provider edge (PE) device's IP address. This address should be common for all EVIs on the PE device, and may be the PE device's loopback address.</li> </ul> </li> </ul> |
| label stacking                                 | <p>(Next-to-the-last-hop routing device for MPLS only) Depth of the MPLS label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> <li>• <b>S=0 route</b> indicates that a packet with an incoming label stack depth of 2 or more exits this routing device with one fewer label (the label-popping operation is performed).</li> <li>• If there is no <b>S=</b> information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| [ <i>protocol, preference</i> ]                | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 199: show route table Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level                                         | (IS-IS only). In IS-IS, a single AS can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Route Distinguisher                           | IP subnet augmented with a 64-bit prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| PMSI                                          | Provider multicast service interface (MVPN routing table).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Next-hop type                                 | Type of next hop. For a description of possible values for this field, see <a href="#">Table 184 on page 1892</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Next-hop reference count                      | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Flood nexthop branches exceed maximum message | Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Source                                        | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Next hop                                      | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| via                                           | Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word <b>Selected</b> . This field can also contain the following information: <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> </ul> |
| Label-switched-path <i>lsp-path-name</i>      | Name of the LSP used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Label operation                               | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Interface                                     | (Local only) Local interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Protocol next hop                             | Network layer address of the remote routing device that advertised the prefix. This address is used to derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Indirect next hop                             | Index designation used to specify the mapping between protocol next hops, tags, kernel export policy, and the forwarding next hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| State                                         | State of the route (a route can be in more than one state). See <a href="#">Table 185 on page 1894</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 199: show route table Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local AS          | AS number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Age               | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| AIGP              | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Metric $n$        | Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MED-plus-IGP      | Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| TTL-Action        | For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signaled and LDP-signaled LSPs or for specific VRF routing instances.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Task              | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Announcement bits | <p>The number of BGP peers or protocols to which Junos OS has announced this route, followed by the list of the recipients of the announcement. Junos OS can also announce the route to the KRT for installing the route into the Packet Forwarding Engine, to a resolve tree, a L2 VC, or even a VPN. For example, <b><math>n</math>-Resolve inet</b> indicates that the specified route is used for route resolution for next hops found in the routing table.</p> <ul style="list-style-type: none"> <li><math>n</math>—An index used by Juniper Networks customer support only.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| AS path           | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li><b>I</b>—IGP.</li> <li><b>E</b>—EGP.</li> <li><b>Recorded</b>—The AS path is recorded by the sample process (sampled).</li> <li><b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li><b>[ ]</b>—Brackets enclose the number that precedes the AS path. This number represents the number of ASs present in the AS path, when calculated as defined in RFC 4271. This value is used in the AS-path merge process, as defined in RFC 4893.</li> <li><b>[ ]</b>—If more than one AS number is configured on the routing device, or if AS path prepending is configured, brackets enclose the local AS number associated with the AS path.</li> <li><b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li><b>( )</b>—Parentheses enclose a confederation.</li> <li><b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |



Table 199: show route table Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| validation-state        | <p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>—Indicates that the prefix is found, but either the corresponding AS received from the EBGp peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>Unknown</b>—Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>Unverified</b>—Indicates that the origin of the prefix is not verified against the database. This is because the database got populated and the validation is not called for in the BGP import policy, although origin validation is enabled, or the origin validation is not enabled for the BGP peers.</li> <li>• <b>Valid</b>—Indicates that the prefix and autonomous system pair are found in the database.</li> </ul> |
| FECs bound to route     | Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Primary Upstream        | When multipoint LDP with multicast-only fast reroute (MoFRR) is configured, the primary upstream path. MoFRR transmits a multicast join message from a receiver toward a source on a primary path, while also transmitting a secondary multicast join message from the receiver toward the source on a backup path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RPF Nexthops            | When multipoint LDP with MoFRR is configured, the reverse-path forwarding (RPF) next-hop information. Data packets are received from both the primary path and the secondary paths. The redundant packets are discarded at topology merge points due to the RPF checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Label                   | Multiple MPLS labels are used to control MoFRR stream selection. Each label represents a separate route, but each references the same interface list check. Only the primary label is forwarded while all others are dropped. Multiple interfaces can receive packets using the same label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| weight                  | Value used to distinguish MoFRR primary and backup routes. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VC Label                | MPLS label assigned to the Layer 2 circuit virtual connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MTU                     | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| VLAN ID                 | VLAN identifier of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Prefixes bound to route | Forwarding equivalent class (FEC) bound to this route. Applicable only to routes installed by LDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Communities             | Community path attribute for the route. See <a href="#">Table 186 on page 1896</a> for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Layer2-info: encaps     | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| control flags           | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| mtu                     | Maximum transmission unit (MTU) information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Label-Base, range       | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| status vector           | Layer 2 VPN and VPLS network layer reachability information (NLRI).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 199: show route table Output Fields (*continued*)

| Field Name                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accepted Multipath                  | Current active path when BGP multipath is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Accepted LongLivedStale             | The LongLivedStale flag indicates that the route was marked LLGR-stale by this router, as part of the operation of LLGR receiver mode. Either this flag or the LongLivedStaleImport flag might be displayed for a route. Neither of these flags is displayed at the same time as the Stale (ordinary GR stale) flag.                                                                                                                                                                  |
| Accepted LongLivedStaleImport       | <p>The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy. Either this flag or the LongLivedStale flag might be displayed for a route. Neither of these flags is displayed at the same time as the Stale (ordinary GR stale) flag.</p> <p>Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and import into the inet.0 routing table</p> |
| ImportAccepted LongLivedStaleImport | <p>Accept all received BGP long-lived graceful restart (LLGR) and LLGR stale routes learned from configured neighbors and imported into the inet.0 routing table</p> <p>The LongLivedStaleImport flag indicates that the route was marked LLGR-stale when it was received from a peer, or by import policy.</p>                                                                                                                                                                       |
| Accepted MultipathContrib           | Path currently contributing to BGP multipath.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Localpref                           | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Router ID                           | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Primary Routing Table               | In a routing table group, the name of the primary routing table in which the route resides.                                                                                                                                                                                                                                                                                                                                                                                           |
| Secondary Tables                    | In a routing table group, the name of one or more secondary tables in which the route resides.                                                                                                                                                                                                                                                                                                                                                                                        |

[Table 184 on page 1892](#) describes all possible values for the Next-hop Types output field.

Table 200: Next-hop Types Output Field Values

| Next-Hop Type     | Description                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Broadcast (bcast) | Broadcast next hop.                                                                                                                                                                                                                                                            |
| Deny              | Deny next hop.                                                                                                                                                                                                                                                                 |
| Discard           | Discard next hop.                                                                                                                                                                                                                                                              |
| Flood             | Flood next hop. Consists of components called branches, up to a maximum of 32 branches. Each flood next-hop branch sends a copy of the traffic to the forwarding interface. Used by point-to-multipoint RSVP, point-to-multipoint LDP, point-to-multipoint CCC, and multicast. |

Table 200: Next-hop Types Output Field Values (*continued*)

| Next-Hop Type            | Description                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hold                     | Next hop is waiting to be resolved into a unicast or multicast type.                                                                                                                                                                                                                                                                                                                                       |
| Indexed (idxd)           | Indexed next hop.                                                                                                                                                                                                                                                                                                                                                                                          |
| Indirect (indr)          | Used with applications that have a protocol next hop address that is remote. You are likely to see this next-hop type for internal BGP (IBGP) routes when the BGP next hop is a BGP neighbor that is not directly connected.                                                                                                                                                                               |
| Interface                | Used for a network address assigned to an interface. Unlike the router next hop, the interface next hop does not reference any specific node on the network.                                                                                                                                                                                                                                               |
| Local (locl)             | Local address on an interface. This next-hop type causes packets with this destination address to be received locally.                                                                                                                                                                                                                                                                                     |
| Multicast (mcst)         | Wire multicast next hop (limited to the LAN).                                                                                                                                                                                                                                                                                                                                                              |
| Multicast discard (mdsc) | Multicast discard.                                                                                                                                                                                                                                                                                                                                                                                         |
| Multicast group (mgrp)   | Multicast group member.                                                                                                                                                                                                                                                                                                                                                                                    |
| Receive (recv)           | Receive.                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reject (rjct)            | Discard. An ICMP unreachable message was sent.                                                                                                                                                                                                                                                                                                                                                             |
| Resolve (rslv)           | Resolving next hop.                                                                                                                                                                                                                                                                                                                                                                                        |
| Routed multicast (mcrtr) | Regular multicast next hop.                                                                                                                                                                                                                                                                                                                                                                                |
| Router                   | <p>A specific node or set of nodes to which the routing device forwards packets that match the route prefix.</p> <p>To qualify as next-hop type router, the route must meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Must not be a direct or local subnet for the routing device.</li> <li>• Must have a next hop that is directly connected to the routing device.</li> </ul> |
| Table                    | Routing table next hop.                                                                                                                                                                                                                                                                                                                                                                                    |
| Unicast (ucst)           | Unicast.                                                                                                                                                                                                                                                                                                                                                                                                   |
| Unilist (ulst)           | List of unicast next hops. A packet sent to this next hop goes to any next hop in the list.                                                                                                                                                                                                                                                                                                                |

Table 185 on page 1894 describes all possible values for the State output field. A route can be in more than one state (for example, <Active NoReadvrt Int Ext>).

**Table 201: State Output Field Values**

| Value                                       | Description                                                                                                                                                                          |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accounting                                  | Route needs accounting.                                                                                                                                                              |
| Active                                      | Route is active.                                                                                                                                                                     |
| Always Compare MED                          | Path with a lower multiple exit discriminator (MED) is available.                                                                                                                    |
| AS path                                     | Shorter AS path is available.                                                                                                                                                        |
| Cisco Non-deterministic MED selection       | Cisco nondeterministic MED is enabled, and a path with a lower MED is available.                                                                                                     |
| Clone                                       | Route is a clone.                                                                                                                                                                    |
| Cluster list length                         | Length of cluster list sent by the route reflector.                                                                                                                                  |
| Delete                                      | Route has been deleted.                                                                                                                                                              |
| Ex                                          | Exterior route.                                                                                                                                                                      |
| Ext                                         | BGP route received from an external BGP neighbor.                                                                                                                                    |
| FlashAll                                    | Forces all protocols to be notified of a change to any route, active or inactive, for a prefix. When not set, protocols are informed of a prefix only when the active route changes. |
| Hidden                                      | Route not used because of routing policy.                                                                                                                                            |
| IfCheck                                     | Route needs forwarding RPF check.                                                                                                                                                    |
| IGP metric                                  | Path through next hop with lower IGP metric is available.                                                                                                                            |
| Inactive reason                             | Flags for this route, which was not selected as best for a particular destination.                                                                                                   |
| Initial                                     | Route being added.                                                                                                                                                                   |
| Int                                         | Interior route.                                                                                                                                                                      |
| Int Ext                                     | BGP route received from an internal BGP peer or a BGP confederation peer.                                                                                                            |
| Interior > Exterior > Exterior via Interior | Direct, static, IGP, or EBGp path is available.                                                                                                                                      |

Table 201: State Output Field Values (*continued*)

| Value                          | Description                                                                                                                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local Preference               | Path with a higher local preference value is available.                                                                                                                                                                           |
| Martian                        | Route is a martian (ignored because it is obviously invalid).                                                                                                                                                                     |
| MartianOK                      | Route exempt from martian filtering.                                                                                                                                                                                              |
| Next hop address               | Path with lower metric next hop is available.                                                                                                                                                                                     |
| No difference                  | Path from neighbor with lower IP address is available.                                                                                                                                                                            |
| NoReadvrt                      | Route not to be advertised.                                                                                                                                                                                                       |
| NotBest                        | Route not chosen because it does not have the lowest MED.                                                                                                                                                                         |
| Not Best in its group          | Incoming BGP AS is not the best of a group (only one AS can be the best).                                                                                                                                                         |
| NotInstall                     | Route not to be installed in the forwarding table.                                                                                                                                                                                |
| Number of gateways             | Path with a greater number of next hops is available.                                                                                                                                                                             |
| Origin                         | Path with a lower origin code is available.                                                                                                                                                                                       |
| Pending                        | Route pending because of a hold-down configured on another route.                                                                                                                                                                 |
| Release                        | Route scheduled for release.                                                                                                                                                                                                      |
| RIB preference                 | Route from a higher-numbered routing table is available.                                                                                                                                                                          |
| Route Distinguisher            | 64-bit prefix added to IP subnets to make them unique.                                                                                                                                                                            |
| Route Metric or MED comparison | Route with a lower metric or MED is available.                                                                                                                                                                                    |
| Route Preference               | Route with lower preference value is available.                                                                                                                                                                                   |
| Router ID                      | Path through a neighbor with lower ID is available.                                                                                                                                                                               |
| Secondary                      | Route not a primary route.                                                                                                                                                                                                        |
| Unusable path                  | Path is not usable because of one of the following conditions: <ul style="list-style-type: none"> <li>• The route is damped.</li> <li>• The route is rejected by an import policy.</li> <li>• The route is unresolved.</li> </ul> |
| Update source                  | Last tiebreaker is the lowest IP address value.                                                                                                                                                                                   |

Table 186 on page 1896 describes the possible values for the Communities output field.

Table 202: Communities Output Field Values

| Value                                                   | Description                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>area-number</i>                                      | 4 bytes, encoding a 32-bit area number. For AS-external routes, the value is 0. A nonzero value identifies the route as internal to the OSPF domain, and as within the identified area. Area numbers are relative to a particular OSPF domain.                                        |
| <b>bandwidth: local AS number:link-bandwidth-number</b> | Link-bandwidth community value used for unequal-cost load balancing. When BGP has several candidate paths available for multipath purposes, it does not perform unequal-cost load balancing according to the link-bandwidth community unless all candidate paths have this attribute. |
| <b>domain-id</b>                                        | Unique configurable number that identifies the OSPF domain.                                                                                                                                                                                                                           |
| <b>domain-id-vendor</b>                                 | Unique configurable number that further identifies the OSPF domain.                                                                                                                                                                                                                   |
| <i>link-bandwidth-number</i>                            | Link-bandwidth number: from 0 through 4,294,967,295 (bytes per second).                                                                                                                                                                                                               |
| <i>local AS number</i>                                  | Local AS number: from 1 through 65,535.                                                                                                                                                                                                                                               |
| <i>options</i>                                          | 1 byte. Currently this is only used if the route type is 5 or 7. Setting the least significant bit in the field indicates that the route carries a type 2 metric.                                                                                                                     |
| <b>origin</b>                                           | (Used with VPNs) Identifies where the route came from.                                                                                                                                                                                                                                |
| <i>ospf-route-type</i>                                  | 1 byte, encoded as 1 or 2 for intra-area routes (depending on whether the route came from a type 1 or a type 2 LSA); 3 for summary routes; 5 for external routes (area number must be 0); 7 for NSSA routes; or 129 for sham link endpoint addresses.                                 |
| <b>route-type-vendor</b>                                | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute 0x8000. The format is <b>area-number:ospf-route-type:options</b> .                                                                                  |
| <b>rte-type</b>                                         | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute 0x0306. The format is <b>area-number:ospf-route-type:options</b> .                                                                                  |
| <b>target</b>                                           | Defines which VPN the route participates in; <b>target</b> has the format <b>32-bit IP address:16-bit number</b> . For example, 10.19.0.0:100.                                                                                                                                        |
| <b>unknown IANA</b>                                     | Incoming IANA codes with a value between 0x1 and 0x7fff. This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                     |
| <b>unknown OSPF vendor community</b>                    | Incoming IANA codes with a value above 0x8000. This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                               |

## Sample Output

### show route table bgp.l2vpn

```
user@host> show route table bgp.l2vpn
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.24.1:1:4:1/96
 *[BGP/170] 01:08:58, localpref 100, from 192.168.24.1
 AS path: I
 > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am
```

### show route table bgp.l3vpn.0

```
user@host> show route table bgp.l3vpn.0
bgp.l3vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.71.15:100:10.255.71.17/32
 *[BGP/170] 00:03:59, MED 1, localpref 100, from
10.255.71.15
 AS path: I
 > via so-2/1/0.0, Push 100020, Push 100011(top)
10.255.71.15:200:10.255.71.18/32
 *[BGP/170] 00:03:59, MED 1, localpref 100, from
10.255.71.15
 AS path: I
 > via so-2/1/0.0, Push 100021, Push 100011(top)
```

### show route table bgp.l3vpn.0 detail

```
user@host> show route table bgp.l3vpn.0 detail
bgp.l3vpn.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)

10.255.245.12:1:4.0.0.0/8 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.245.12:1
 Source: 10.255.245.12
 Next hop: 192.168.208.66 via fe-0/0/0.0, selected
 Label operation: Push 182449
 Protocol next hop: 10.255.245.12
 Push 182449
 Indirect next hop: 863a630 297
 State: <Active Int Ext>
 Local AS: 35 Peer AS: 35
 Age: 12:19 Metric2: 1
 Task: BGP_35.10.255.245.12+179
 Announcement bits (1): 0-BGP.0.0.0.0+179
 AS path: 30 10458 14203 2914 3356 I (Atomic) Aggregator: 3356 4.68.0.11

 Communities: 2914:420 target:11111:1 origin:56:78
 VPN Label: 182449
 Localpref: 100
 Router ID: 10.255.245.12

10.255.245.12:1:4.17.225.0/24 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.245.12:1
 Source: 10.255.245.12
 Next hop: 192.168.208.66 via fe-0/0/0.0, selected
```

```

Label operation: Push 182465
Protocol next hop: 10.255.245.12
Push 182465
Indirect next hop: 863a8f0 305
State: <Active Int Ext>
Local AS: 35 Peer AS: 35
Age: 12:19 Metric2: 1
Task: BGP_35.10.255.245.12+179
Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 6496 6496 6496 6496 6496 6496 I
Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
VPN Label: 182465
Localpref: 100
Router ID: 10.255.245.12

10.255.245.12:1:4.17.226.0/23 (1 entry, 1 announced)
*BGP Preference: 170/-101
Route Distinguisher: 10.255.245.12:1
Source: 10.255.245.12
Next hop: 192.168.208.66 via fe-0/0/0.0, selected
Label operation: Push 182465
Protocol next hop: 10.255.245.12
Push 182465
Indirect next hop: 86bd210 330
State: <Active Int Ext>
Local AS: 35 Peer AS: 35
Age: 12:19 Metric2: 1
Task: BGP_35.10.255.245.12+179
Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 6496 6496 6496 6496 6496
6496 I
Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
VPN Label: 182465
Localpref: 100
Router ID: 10.255.245.12

10.255.245.12:1:4.17.251.0/24 (1 entry, 1 announced)
*BGP Preference: 170/-101
Route Distinguisher: 10.255.245.12:1
Source: 10.255.245.12
Next hop: 192.168.208.66 via fe-0/0/0.0, selected
Label operation: Push 182465
Protocol next hop: 10.255.245.12
Push 182465
Indirect next hop: 86bd210 330
State: <Active Int Ext>
Local AS: 35 Peer AS: 35
Age: 12:19 Metric2: 1
Task: BGP_35.10.255.245.12+179
Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 6496 6496 6496 6496 6496
6496 I
Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
VPN Label: 182465
Localpref: 100

```

### show route table bgp.rtarget.0 (When Proxy BGP Route Target Filtering Is Configured)

```
user@host> show route table bgp.rtarget.0
```



```

bgp.rtarget.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

```

100:100:100/96
 *[RTarget/5] 00:03:14
 Type Proxy
 for 10.255.165.103
 for 10.255.166.124
 Local

```

### show route table bgp.evpn.0

```

user@host> show route table bgp.evpn.0
bgp.evpn.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

2:100.100.100.2:100::0::00:26:88:5f:67:b0/304
 * [BGP/170] 11:00:05, localpref 100, from 100.100.100.2
 AS path: I, validation-state: unverified
 > to 100.1.12.2 via xe-2/2/0.0, label-switched-path R0toR1
2:100.100.100.2:100::0::00:51:51:51:51:51/304
 * [BGP/170] 11:00:05, localpref 100, from 100.100.100.2
 AS path: I, validation-state: unverified
 > to 100.1.12.2 via xe-2/2/0.0, label-switched-path R0toR1
2:100.100.100.3:100::0::00:52:52:52:52:52/304
 * [BGP/170] 10:59:58, localpref 100, from 100.100.100.3
 AS path: I, validation-state: unverified
 > to 100.1.13.3 via ge-2/0/8.0, label-switched-path R0toR2
2:100.100.100.3:100::0::a8:d0:e5:5b:01:c8/304
 * [BGP/170] 10:59:58, localpref 100, from 100.100.100.3
 AS path: I, validation-state: unverified
 > to 100.1.13.3 via ge-2/0/8.0, label-switched-path R0toR2
3:100.100.100.2:100::1000::100.100.100.2/304
 * [BGP/170] 11:00:16, localpref 100, from 100.100.100.2
 AS path: I, validation-state: unverified
 > to 100.1.12.2 via xe-2/2/0.0, label-switched-path R0toR1
3:100.100.100.2:100::2000::100.100.100.2/304
 * [BGP/170] 11:00:16, localpref 100, from 100.100.100.2
 AS path: I, validation-state: unverified
 > to 100.1.12.2 via xe-2/2/0.0, label-switched-path R0toR1

```

### show route table evpna.evpn.0

```

user@host> show route table evpna.evpn.0
evpna.evpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

3:100.100.100.10:100::0::10::100.100.100.10/384
 * [EVPN/170] 01:37:09
 Indirect
3:100.100.100.2:100::2000::100.100.100.2/304
 * [EVPN/170] 01:37:12
 Indirect

```

### show route table inet.0

```

user@host> show route table inet.0
inet.0: 12 destinations, 12 routes (11 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0
 * [Static/5] 00:51:57
 > to 111.222.5.254 via fxp0.0

```

```
1.0.0.1/32 *[Direct/0] 00:51:58
 > via at-5/3/0.0
1.0.0.2/32 *[Local/0] 00:51:58
 Local
12.12.12.21/32 *[Local/0] 00:51:57
 Reject
13.13.13.13/32 *[Direct/0] 00:51:58
 > via t3-5/2/1.0
13.13.13.14/32 *[Local/0] 00:51:58
 Local
13.13.13.21/32 *[Local/0] 00:51:58
 Local
13.13.13.22/32 *[Direct/0] 00:33:59
 > via t3-5/2/0.0
127.0.0.1/32 [Direct/0] 00:51:58
 > via lo0.0
111.222.5.0/24 *[Direct/0] 00:51:58
 > via fxp0.0
111.222.5.81/32 *[Local/0] 00:51:58
 Local
```

### show route table inet.3

```
user@host> show route table inet.3
inet.3: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

22.0.0.5/32 *[LDP/9] 00:25:43, metric 10, tag 200
 to 1.2.94.2 via lt-1/2/0.49
 > to 1.2.3.2 via lt-1/2/0.23
```

### show route table inet6.0

```
user@host> show route table inet6.0
inet6.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Route, * = Both

fec0:0:0:3::/64 *[Direct/0] 00:01:34
>via fe-0/1/0.0

fec0:0:0:3::/128 *[Local/0] 00:01:34
>Local

fec0:0:0:4::/64 *[Static/5] 00:01:34
>to fec0:0:0:3::ffff via fe-0/1/0.0
```

### show route table inet6.3

```
user@router> show route table inet6.3
inet6.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

::10.255.245.195/128
 *[LDP/9] 00:00:22, metric 1
 > via so-1/0/0.0
::10.255.245.196/128
 *[LDP/9] 00:00:08, metric 1
 > via so-1/0/0.0, Push 100008
```

**show route table inetflow detail**

```

user@host> show route table inetflow detail
inetflow.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.12.44.1,*/48 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Next-hop reference count: 2
 State: <Active Ext>
 Local AS: 65002 Peer AS: 65000
 Age: 4
 Task: BGP_65000.10.12.99.5+3792
 Announcement bits (1): 0-Flow
 AS path: 65000 I
 Communities: traffic-rate:0:0
 Validation state: Accept, Originator: 10.12.99.5
 Via: 10.12.44.0/24, Active
 Localpref: 100
 Router ID: 10.255.71.161

10.12.56.1,*/48 (1 entry, 1 announced)
 *Flow Preference: 5
 Next-hop reference count: 2
 State: <Active>
 Local AS: 65002
 Age: 6:30
 Task: RT Flow
 Announcement bits (2): 0-Flow 1-BGP.0.0.0.0+179
 AS path: I
 Communities: 1:1

```

**show route table l2circuit.0**

```

user@host> show route table l2circuit.0
l2circuit.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.1.1.195:NoCtrlWord:1:1:Local/96
 *[L2CKT/7] 00:50:47
 > via so-0/1/2.0, Push 100049
 via so-0/1/3.0, Push 100049
10.1.1.195:NoCtrlWord:1:1:Remote/96
 *[LDP/9] 00:50:14
 Discard
10.1.1.195:CtrlWord:1:2:Local/96
 *[L2CKT/7] 00:50:47
 > via so-0/1/2.0, Push 100049
 via so-0/1/3.0, Push 100049
10.1.1.195:CtrlWord:1:2:Remote/96
 *[LDP/9] 00:50:14
 Discard

```

**show route table mpls**

```

user@host> show route table mpls
mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0 *[MPLS/0] 00:13:55, metric 1
 Receive
1 *[MPLS/0] 00:13:55, metric 1
 Receive

```

```

2 *[MPLS/0] 00:13:55, metric 1
 Receive
1024 *[VPN/0] 00:04:18
 to table red.inet.0, Pop

```

### show route table mpls extensive

```

user@host> show route table mpls extensive
100000 (1 entry, 1 announced)
TSI:
KRT in-kernel 100000 /36 -> {so-1/0/0.0}
 *LDP Preference: 9
 Next hop: via so-1/0/0.0, selected
 Pop
 State: <Active Int>
 Age: 29:50 Metric: 1
 Task: LDP
 Announcement bits (1): 0-KRT
 AS path: I
 Prefixes bound to route: 10.0.0.194/32

```

### show route table mpls.0

```

user@host> show route table mpls.0
mpls.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0 *[MPLS/0] 00:45:09, metric 1
 Receive
1 *[MPLS/0] 00:45:09, metric 1
 Receive
2 *[MPLS/0] 00:45:09, metric 1
 Receive
100000 *[L2VPN/7] 00:43:04
 > via so-0/1/0.1, Pop
100001 *[L2VPN/7] 00:43:03
 > via so-0/1/0.2, Pop Offset: 4
100002 *[LDP/9] 00:43:22, metric 1
 via so-0/1/2.0, Pop
 > via so-0/1/3.0, Pop
100002(S=0) *[LDP/9] 00:43:22, metric 1
 via so-0/1/2.0, Pop
 > via so-0/1/3.0, Pop
100003 *[LDP/9] 00:43:22, metric 1
 > via so-0/1/2.0, Swap 100002
 via so-0/1/3.0, Swap 100002
100004 *[LDP/9] 00:43:16, metric 1
 via so-0/1/2.0, Swap 100049
 > via so-0/1/3.0, Swap 100049
so-0/1/0.1 *[L2VPN/7] 00:43:04
 > via so-0/1/2.0, Push 100001, Push 100049(top)
 via so-0/1/3.0, Push 100001, Push 100049(top)
so-0/1/0.2 *[L2VPN/7] 00:43:03
 via so-0/1/2.0, Push 100000, Push 100049(top) Offset: -4
 > via so-0/1/3.0, Push 100000, Push 100049(top) Offset: -4

```

### show route table mpls.0 detail (PTX Series)

```

user@host> show route table mpls.0 detail
ge-0/0/2.600 (1 entry, 1 announced)
 *L2VPN Preference: 7
 Next hop type: Indirect

```

```

Address: 0x9438f34
Next-hop reference count: 2
Next hop type: Router, Next hop index: 567
Next hop: 3.0.0.1 via ge-0/0/1.0, selected
Label operation: Push 299808
Label TTL action: prop-ttl
Load balance label: Label 299808:None;
Session Id: 0x1
Protocol next hop: 10.255.255.1
Label operation: Push 299872 Offset: 252
Label TTL action: no-prop-ttl
Load balance label: Label 299872:Flow label PUSH;
Composite next hop: 0x9438ed8 570 INH Session ID: 0x2
Indirect next hop: 0x9448208 262142 INH Session ID: 0x2
State: <Active Int>
Age: 21 Metric2: 1
Validation State: unverified
Task: Common L2 VC
Announcement bits (2): 0-KRT 2-Common L2 VC
AS path: I

```

#### show route table mpls.0 extensive (PTX Series)

```

user@host> show route table mpls.0 extensive
ge-0/0/2.600 (1 entry, 1 announced)
TSI:
KRT in-kernel ge-0/0/2.600.0 /32 -> {composite(570)}
 *L2VPN Preference: 7
 Next hop type: Indirect
 Address: 0x9438f34
 Next-hop reference count: 2
 Next hop type: Router, Next hop index: 567
 Next hop: 3.0.0.1 via ge-0/0/1.0, selected
 Label operation: Push 299808
 Label TTL action: prop-ttl
 Load balance label: Label 299808:None;
 Session Id: 0x1
 Protocol next hop: 10.255.255.1
 Label operation: Push 299872 Offset: 252
 Label TTL action: no-prop-ttl
 Load balance label: Label 299872:Flow label PUSH;
 Composite next hop: 0x9438ed8 570 INH Session ID: 0x2
 Indirect next hop: 0x9448208 262142 INH Session ID: 0x2
 State: <Active Int>
 Age: 47 Metric2: 1
 Validation State: unverified
 Task: Common L2 VC
 Announcement bits (2): 0-KRT 2-Common L2 VC
 AS path: I
 Composite next hops: 1
 Protocol next hop: 10.255.255.1 Metric: 1
 Label operation: Push 299872 Offset: 252
 Label TTL action: no-prop-ttl
 Load balance label: Label 299872:Flow label PUSH;
 Composite next hop: 0x9438ed8 570 INH Session ID: 0x2
 Indirect next hop: 0x9448208 262142 INH Session ID: 0x2
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 3.0.0.1 via ge-0/0/1.0
 Session Id: 0x1
 10.255.255.1/32 Originating RIB: inet.3

```

```

Metric: 1
Forwarding nexthops: 1
Node path count: 1
Nexthop: 3.0.0.1 via ge-0/0/1.0

```

### show route table mpls.0 (RSVP Route—Transit LSP)

In the sample output, the 1 in [RSVP/7/1] indicates the secondary preference value. The secondary preference value becomes significant when multiple RSVP LSPs of different types are signaled to the destination. The possible values of RSVP secondary preferences are:

1—Normal Point-to-Point RSVP-TE LSP

2—Point-to-Multipoint (P2MP) RSVP-TE LSP

3—Dynamic RSVP-TE LSP

```
user@host> show route table mpls.0
```

```
mpls.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
```

```

0 *[MPLS/0] 00:37:31, metric 1
 Receive
1 *[MPLS/0] 00:37:31, metric 1
 Receive
2 *[MPLS/0] 00:37:31, metric 1
 Receive
13 *[MPLS/0] 00:37:31, metric 1
 Receive
300352 *[RSVP/7/1] 00:08:00, metric 1
 > to 8.64.0.106 via ge-1/0/1.0, label-switched-path lsp1_p2p
300352(S=0) *[RSVP/7/1] 00:08:00, metric 1
 > to 8.64.0.106 via ge-1/0/1.0, label-switched-path lsp1_p2p
300384 *[RSVP/7/2] 00:05:20, metric 1
 > to 8.64.1.106 via ge-1/0/0.0, Pop
300384(S=0) *[RSVP/7/2] 00:05:20, metric 1
 > to 8.64.1.106 via ge-1/0/0.0, Pop

```

### show route table vpls\_1 detail

```
user@host> show route table vpls_1 detail
```

```
vpls_1.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete
```

```

1.1.1.11:1000:1:1/96 (1 entry, 1 announced)
*L2VPN Preference: 170/-1
Receive table: vpls_1.l2vpn.0
Next-hop reference count: 2
State: <Active Int Ext>
Age: 4:29:47 Metric2: 1
Task: vpls_1-l2vpn
Announcement bits (1): 1-BGP.0.0.0.0+179
AS path: I
Communities: Layer2-info: encaps:VPLS, control flags:Site-Down
Label-base: 800000, range: 8, status-vector: 0xFF

```

### show route table vpn-a

```
user@host> show route table vpn-a
```

```

vpn-a.12vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
192.168.16.1:1:1:1/96
 *[VPN/7] 05:48:27
 Discard
192.168.24.1:1:2:1/96
 *[BGP/170] 00:02:53, localpref 100, from 192.168.24.1
 AS path: I
 > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am
192.168.24.1:1:3:1/96
 *[BGP/170] 00:02:53, localpref 100, from 192.168.24.1
 AS path: I
 > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am

```

#### show route table vpn-a.mdt.0

```

user@host> show route table vpn-a.mdt.0
vpn-a.mdt.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1:1:0:10.255.14.216:232.1.1.1/144
 *[MVPN/70] 01:23:05, metric2 1
 Indirect
1:1:1:10.255.14.218:232.1.1.1/144
 *[BGP/170] 00:57:49, localpref 100, from 10.255.14.218
 AS path: I
 > via so-0/0/0.0, label-switched-path r0e-to-r1
1:1:2:10.255.14.217:232.1.1.1/144
 *[BGP/170] 00:57:49, localpref 100, from 10.255.14.217
 AS path: I
 > via so-0/0/1.0, label-switched-path r0-to-r2

```

#### show route table VPN-A detail

```

user@host> show route table VPN-A detail
VPN-AB.inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
10.255.179.9/32 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 10.255.179.13:200
 Next hop type: Indirect
 Next-hop reference count: 5
 Source: 10.255.179.13
 Next hop type: Router, Next hop index: 732
 Next hop: 10.39.1.14 via fe-0/3/0.0, selected
 Label operation: Push 299824, Push 299824(top)
 Protocol next hop: 10.255.179.13
 Push 299824
 Indirect next hop: 8f275a0 1048574
 State: (Secondary Active Int Ext)
 Local AS: 1 Peer AS: 1
 Age: 3:41:06 Metric: 1 Metric2: 1
 Task: BGP_1.10.255.179.13+64309
 Announcement bits (2): 0-KRT 1-BGP RT Background
 AS path: I
 Communities: target:1:200 rte-type:0.0.0.0:1:0
 Import Accepted
 VPN Label: 299824 TTL Action: vrf-ttl-propagate
 Localpref: 100
 Router ID: 10.255.179.13
 Primary Routing Table bgp.13vpn.0

```

**show route table VPN-AB.inet.0**

```

user@host> show route table VPN-AB.inet.0
VPN-AB.inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.0/30 *[OSPF/10] 00:07:24, metric 1
 > via so-7/3/1.0
10.39.1.4/30 *[Direct/0] 00:08:42
 > via so-5/1/0.0
10.39.1.6/32 *[Local/0] 00:08:46
 Local
10.255.71.16/32 *[Static/5] 00:07:24
 > via so-2/0/0.0
10.255.71.17/32 *[BGP/170] 00:07:24, MED 1, localpref 100, from
10.255.71.15
 AS path: I
 > via so-2/1/0.0, Push 100020, Push 100011(top)
10.255.71.18/32 *[BGP/170] 00:07:24, MED 1, localpref 100, from
10.255.71.15
 AS path: I
 > via so-2/1/0.0, Push 100021, Push 100011(top)
10.255.245.245/32 *[BGP/170] 00:08:35, localpref 100
 AS path: 2 I
 > to 10.39.1.5 via so-5/1/0.0
10.255.245.246/32 *[OSPF/10] 00:07:24, metric 1
 > via so-7/3/1.0

```

**show route table VPN\_blue.mvpn-inet6.0**

```

user@host> show route table VPN_blue.mvpn-inet6.0
vpn_blue.mvpn-inet6.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1:10.255.2.202:65535:10.255.2.202/432
 *[BGP/170] 00:02:37, localpref 100, from 10.255.2.202
 AS path: I
 > via so-0/1/3.0
1:10.255.2.203:65535:10.255.2.203/432
 *[BGP/170] 00:02:37, localpref 100, from 10.255.2.203
 AS path: I
 > via so-0/1/0.0
1:10.255.2.204:65535:10.255.2.204/432
 *[MVPN/70] 00:57:23, metric2 1
 Indirect
5:10.255.2.202:65535:128::192.168.90.2:128:ffff::1/432
 *[BGP/170] 00:02:37, localpref 100, from 10.255.2.202
 AS path: I
 > via so-0/1/3.0
6:10.255.2.203:65535:65000:128::10.12.53.12:128:ffff::1/432
 *[PIM/105] 00:02:37
 Multicast (IPv6)
7:10.255.2.202:65535:65000:128::192.168.90.2:128:ffff::1/432
 *[MVPN/70] 00:02:37, metric2 1
 Indirect

```

**show route table vrf1.mvpn.0 extensive**

```

user@host> show route table vrf1.mvpn.0 extensive
1:10.255.50.77:1:10.255.50.77/240 (1 entry, 1 announced)
 *MVPN Preference: 70

```



```

PMSI: Flags 0x0: Label 0: RSVP-TE:
Session_13[10.255.50.77:0:25624:10.255.50.77]
 Next hop type: Indirect
 Address: 0xbb2c944
 Next-hop reference count: 360
 Protocol next hop: 10.255.50.77
 Indirect next hop: 0x0 - INH Session ID: 0x0
 State: <Active Int Ext>
 Age: 53:03 Metric2: 1
 Validation State: unverified
 Task: mvpn global task
 Announcement bits (3): 0-PIM.vrf1 1-mvpn global task 2-rt-export

AS path: I

```

### show route table MVPN.mvpn.0

Starting in Junos OS Release 15.1, multicast routes on the locally originated type 7 customer multicast routes are added exclusively by PIM. The functionality of the BGP-MVPN service (which, internally, depends on contributions of state from both the MVPN and PIM protocol components of Junos OS) remains unchanged. MVPN, however, no longer appears as the originator of the locally advertised route. Routes advertised by remote PEs are, as usual, always learned locally from their respective [BGP/...] protocol.

```

user@host> show route table MVPN.mvpn.0
MVPN.mvpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

7:10.255.2.202:65535:65000:128:::192.168.90.2:128:ffff::1/432
 *[PIM/70] 00:02:37, metric2 1
 Indirect
5:100:32:192.168.1.9:32:239.1.1.1/240
 *[PIM/105] 01:51:21
 Multicast (IPv4)
7:100:1:100.32.192.168.5:32:237.1.1.1/240
 *[PIM/105] 01:51:21
 Multicast (IPv4)

```

### show route table inetflow detail

```

user@host> show route table inetflow detail
inetflow.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.12.44.1,*/48 (1 entry, 1 announced)
 *BGP Preference: 170/-101
 Next-hop reference count: 2
 State: <Active Ext>
 Local AS: 65002 Peer AS: 65000
 Age: 4
 Task: BGP_65000.10.12.99.5+3792
 Announcement bits (1): 0-Flow
 AS path: 65000 I
 Communities: traffic-rate:0:0
 Validation state: Accept, Originator: 10.12.99.5
 Via: 10.12.44.0/24, Active
 Localpref: 100
 Router ID: 10.255.71.161

10.12.56.1,*/48 (1 entry, 1 announced)
 *Flow Preference: 5
 Next-hop reference count: 2

```

```

State: <Active>
Local AS: 65002
Age: 6:30
Task: RT Flow
Announcement bits (2): 0-Flow 1-BGP.0.0.0+179
AS path: I
Communities: 1:1

user@PE1> show route table green.l2vpn.0 (VPLS Multihoming with FEC 129)
green.l2vpn.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.2:100:1.1.1.2/96 AD
 *[VPLS/170] 1d 03:11:03, metric2 1
 Indirect
1.1.1.4:100:1.1.1.4/96 AD
 *[BGP/170] 1d 03:11:02, localpref 100, from 1.1.1.4
 AS path: I, validation-state: unverified
 > via ge-1/2/1.5
1.1.1.2:100:1:0/96 MH
 *[VPLS/170] 1d 03:11:03, metric2 1
 Indirect
1.1.1.4:100:1:0/96 MH
 *[BGP/170] 1d 03:11:02, localpref 100, from 1.1.1.4
 AS path: I, validation-state: unverified
 > via ge-1/2/1.5
1.1.1.4:NoCtrlWord:5:100:100:1.1.1.2:1.1.1.4/176
 *[VPLS/7] 1d 03:11:02, metric2 1
 > via ge-1/2/1.5
1.1.1.4:NoCtrlWord:5:100:100:1.1.1.4:1.1.1.2/176
 *[LDP/9] 1d 03:11:02
 Discard

user@host> show route table red extensive
red.inet.0: 364481 destinations, 714087 routes (364480 active, 48448 holddown, 1
hidden)
22.0.0.0/32 (3 entries, 1 announced)
 State: <OnList CalcForwarding>
TSI:
KRT in-kernel 22.0.0.0/32 -> {composite(1048575)} Page 0 idx 1 Type 1 val 0x934342c

 Nexthop: Self
 AS path: [2] I
 Communities: target:2:1
Path 22.0.0.0 from 2.3.0.0 Vector len 4. Val: 1
 @BGP Preference: 170/-1
 Route Distinguisher: 2:1
 Next hop type: Indirect
 Address: 0x258059e4
 Next-hop reference count: 2
 Source: 2.2.0.0
 Next hop type: Router
 Next hop: 10.1.1.1 via ge-1/1/9.0, selected
 Label operation: Push 707633
 Label TTL action: prop-ttl
 Session Id: 0x17d8
 Protocol next hop: 2.2.0.0
 Push 16
 Composite next hop: 0x25805988 - INH Session ID: 0x193c
 Indirect next hop: 0x23eea900 - INH Session ID: 0x193c
 State: <Secondary Active Int Ext ProtectionPath ProtectionCand>

```

```

Local AS: 2 Peer AS: 2
Age: 23 Metric2: 35
Validation State: unverified
Task: BGP_2.2.2.0.0+34549
AS path: I
Communities: target:2:1
Import Accepted
VPN Label: 16
Localpref: 0
Router ID: 2.2.0.0
Primary Routing Table bgp.13vpn.0
Composite next hops: 1
 Protocol next hop: 2.2.0.0 Metric: 35
 Push 16
 Composite next hop: 0x25805988 - INH Session ID: 0x193c
 Indirect next hop: 0x23eea900 - INH Session ID: 0x193c
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.1.1.1 via ge-1/1/9.0
 Session Id: 0x17d8
 2.2.0.0/32 Originating RIB: inet.3
 Metric: 35 Node path count: 1
 Forwarding nexthops: 1
 Nexthop: 10.1.1.1 via ge-1/1/9.0
BGP Preference: 170/-1
Route Distinguisher: 2:1
Next hop type: Indirect
Address: 0x9347028
Next-hop reference count: 3
Source: 2.3.0.0
Next hop type: Router, Next hop index: 702
Next hop: 10.1.4.2 via ge-1/0/0.0, selected
Label operation: Push 634278
Label TTL action: prop-ttl
Session Id: 0x17d9
Protocol next hop: 2.3.0.0
Push 16
Composite next hop: 0x93463a0 1048575 INH Session ID: 0x17da
Indirect next hop: 0x91e8800 1048574 INH Session ID: 0x17da
State: <Secondary NotBest Int Ext ProtectionPath ProtectionCand>

Inactive reason: Not Best in its group - IGP metric
Local AS: 2 Peer AS: 2
Age: 3:34 Metric2: 70
Validation State: unverified
Task: BGP_2.2.3.0.0+32805
Announcement bits (2): 0-KRT 1-BGP_RT_Background
AS path: I
Communities: target:2:1
Import Accepted
VPN Label: 16
Localpref: 0
Router ID: 2.3.0.0
Primary Routing Table bgp.13vpn.0
Composite next hops: 1
 Protocol next hop: 2.3.0.0 Metric: 70
 Push 16
 Composite next hop: 0x93463a0 1048575 INH Session ID:
0x17da
 Indirect next hop: 0x91e8800 1048574 INH Session ID:
0x17da

```

```

Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.1.4.2 via ge-1/0/0.0
 Session Id: 0x17d9
2.3.0.0/32 Originating RIB: inet.3
 Metric: 70
 Forwarding nexthops: 1
 Nexthop: 10.1.4.2 via ge-1/0/0.0
Node path count: 1
#Multipath Preference: 255
 Next hop type: Indirect
 Address: 0x24afca30
 Next-hop reference count: 1
 Next hop type: Router
 Next hop: 10.1.1.1 via ge-1/1/9.0, selected
 Label operation: Push 707633
 Label TTL action: prop-ttl
 Session Id: 0x17d8
 Next hop type: Router, Next hop index: 702
 Next hop: 10.1.4.2 via ge-1/0/0.0
 Label operation: Push 634278
 Label TTL action: prop-ttl
 Session Id: 0x17d9
 Protocol next hop: 2.2.0.0
 Push 16
 Composite next hop: 0x25805988 - INH Session ID: 0x193c
 Indirect next hop: 0x23eea900 - INH Session ID: 0x193c Weight 0x1

 Protocol next hop: 2.3.0.0
 Push 16
 Composite next hop: 0x93463a0 1048575 INH Session ID: 0x17da
 Indirect next hop: 0x91e8800 1048574 INH Session ID: 0x17da Weight

0x4000
 State: <ForwardingOnly Int Ext>
 Inactive reason: Forwarding use only
 Age: 23
 Metric2: 35
 Validation State: unverified
 Task: RT
 AS path: I
 Communities: target:2:1

```

#### show route table bgp.evpn.0 extensive |no-more (EVPN)

```

show route table bgp.evpn.0 extensive | no-more
bgp.evpn.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
2:1000:10::100::00:aa:aa:aa:aa:aa/304 (1 entry, 0 announced)
 *BGP
 Preference: 170/-101
 Route Distinguisher: 1000:10
 Next hop type: Indirect
 Address: 0x9420fd0
 Next-hop reference count: 12
 Source: 1.2.3.4
 Protocol next hop: 1.2.3.4
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 State: Local AS: 17 Peer AS:17 Age:21:12 Metric2:1 Validation State:
unverified
 Task: BGP_17.1.2.3.4+50756
 AS path: I
 Communities: target:1111:8388708 encapsulation0:0:0:0:3
 Import Accepted
 Route Label: 100
 ESI: 00:00:00:00:00:00:00:00:00:00

```

```

Localpref: 100
Router ID: 1.2.3.4
Secondary Tables: default-switch.evpn.0
Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1 Node path count: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0

2:1000:10::200::00:bb:bb:bb:bb:bb/304 (1 entry, 0 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 1000:10
 Next hop type: Indirect
 Address: 0x9420fd0
 Next-hop reference count: 12
 Source: 1.2.3.4
 Protocol next hop: 1.2.3.4
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 State: Local AS:17 Peer AS:17 Age:19:43 Metric2:1 Validation
State:unverified
 Task: BGP_17.1.2.3.4+50756
 AS path: I
 Communities: target:2222:22 encapsulation0:0:0:0:3
 Import Accepted
 Route Label: 200
 ESI: 00:00:00:00:00:00:00:00:00:00:00
 Localpref: 100
 Router ID: 1.2.3.4
 Secondary Tables: default-switch.evpn.0
 Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1 Node path count: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0

2:1000:10::300::00:cc:cc:cc:cc:cc/304 (1 entry, 0 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 1000:10
 Next hop type: Indirect
 Address: 0x9420fd0
 Next-hop reference count: 12
 Source: 1.2.3.4
 Protocol next hop: 1.2.3.4
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 State: Local AS:17 Peer AS:17 Age:17:21 Metric2:1 Validation State:
unverified Task: BGP 17,1,2,3,4+50756
 AS path: I
 Communities: target:3333:33 encapsulation0:0:0:0:3
 Import Accepted

```

```

Route Label: 300
ESI: 00:00:00:00:00:00:00:00:00:00
Localpref: 100
Router ID: 1.2.3.4
Secondary Tables: default-switch.evpn.0
Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1 Node path count: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0

3:1000:10::100::1.2.3.4/304 (1 entry, 0 announced)
*BGP Preference: 170/-101
Route Distinguisher: 1000:10
PMSI: Flags 0x0: Label 100: Type INGRESS-REPLICATION 1.2.3.4
Next hop type: Indirect
Address: 0x9420fd0
Next-hop reference count: 12
Source: 1.2.3.4
Protocol next hop: 1.2.3.4
Indirect next hop: 0x2 no-forward INH Session ID: 0x0
State: Local AS:17 Peer AS:17 Age:37:01 Metric2:1 Validation State:
unverified Task: BGP 17.1.2.3.4+50756
AS path: I
Communities: target:1111:8388708 encapsulation0:0:0:0:3
Import Accepted
Localpref: 100
Router ID: 1.2.3.4
Secondary Tables: default-switch.evpn.0
Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1 Node path count: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0

3:1000:10::200::1.2.3.4/304 (1 entry, 0 announced)
*BGP Preference: 170/-101
Route Distinguisher: 1000:10
PMSI: Flags 0x0: Label 200: Type INGRESS-REPLICATION 1.2.3.4
Next hop type: Indirect
Address: 0x9420fd0
Next-hop reference count: 12
Source: 1.2.3.4
Protocol next hop: 1.2.3.4
Indirect next hop: 0x2 no-forward INH Session ID: 0x0
State: Local AS: 17 Peer AS: 17 Age:35:22 Metric2:1 Validation
State:unverified Task: BGP 17.1.2.3.4+50756
AS path:I Communities: target:2222:22 encapsulation):0:0:0:0:3

```

```

Import Accepted
 Localpref: 100
 Router ID: 1.2.3.4
 Secondary Tables: default-switch.evpn.0
 Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0
 Node path count: 1

3:1000:10::300::1.2.3.4/304 (1 entry, 0 announced)
 *BGP Preference: 170/-101
 Route Distinguisher: 1000:10
 PMSI: Flags 0x0: Label 300: Type INGRESS-REPLICATION 1.2.3.4
 Next hop type: Indirect
 Address: 0x9420fd0
 Next-hop reference count: 12
 Source: 1.2.3.4
 Protocol next hop: 1.2.3.4
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 State: Local AS: 17 Peer AS: 17 Age 35:22 Metric2:1 Validation State:
unverified Task: BGP 17.1.2.3.4+5075
 6 AS path: I Communities: target:3333:33 encapsulation0:0:0:0:3
Import Accepted Localpref:100
 Router ID: 1.2.3.4
 Secondary Tables: default-switch.evpn.0
 Indirect next hops: 1
 Protocol next hop: 1.2.3.4 Metric: 1
 Indirect next hop: 0x2 no-forward INH Session ID: 0x0
 Indirect path forwarding next hops: 1
 Next hop type: Router
 Next hop: 10.10.10.1 via xe-0/0/1.0
 Session Id: 0x2
 1.2.3.4/32 Originating RIB: inet.0
 Metric: 1
 Forwarding nexthops: 2
 Nexthop: 10.92.78.102 via em0.0
 Node path count: 1

```

## show route terse

**List of Syntax** [Syntax on page 2054](#)  
[Syntax \(EX Series Switches\) on page 2054](#)

**Syntax** show route terse  
 <logical-system (all | *logical-system-name*)>

**Syntax (EX Series Switches)** show route terse

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.

**Description** Display a high-level summary of the routes in the routing table.



**NOTE:** For BGP routes, the **show route terse** command displays the local preference attribute and MED instead of metric1 and metric2 values. This is mostly due to historical reasons.

To display the metric1 and metric2 value of a BGP route, use the [show route extensive](#) command.

**Options** none—Display a high-level summary of the routes in the routing table.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**Required Privilege Level** view

**List of Sample Output** [show route terse on page 2056](#)

**Output Fields** [Table 203 on page 2054](#) describes the output fields for the **show route terse** command. Output fields are listed in the approximate order in which they appear.

**Table 203: show route terse Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, <b>inet.0</b> ).                                                                                                                                                                                                                                                                                                        |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                         |
| <i>number routes</i>       | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li><b>active</b> (routes that are active)</li> <li><b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li><b>hidden</b> (routes that are not used because of a routing policy)</li> </ul> |



Table 203: show route terse Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>route key</i>   | <p>Key for the state of the route:</p> <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul>                                                                                                                   |
| <b>A</b>           | Active route. An asterisk (*) indicates this is the active route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Destination</b> | Destination of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>P</b>           | <p>Protocol through which the route was learned:</p> <ul style="list-style-type: none"> <li>• <b>A</b>—Aggregate</li> <li>• <b>B</b>—BGP</li> <li>• <b>C</b>—CCC</li> <li>• <b>D</b>—Direct</li> <li>• <b>G</b>—GMPLS</li> <li>• <b>I</b>—IS-IS</li> <li>• <b>L</b>—L2CKT, L2VPN, LDP, Local</li> <li>• <b>K</b>—Kernel</li> <li>• <b>M</b>—MPLS, MSDP</li> <li>• <b>O</b>—OSPF</li> <li>• <b>P</b>—PIM</li> <li>• <b>R</b>—RIP, RIPng</li> <li>• <b>S</b>—Static</li> <li>• <b>T</b>—Tunnel</li> </ul>                                                                                        |
| <b>Prf</b>         | <p>Preference value of the route. In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p> |
| <b>Metric 1</b>    | First metric value in the route. For routes learned from BGP, this is the MED metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Metric 2</b>    | Second metric value in the route. For routes learned from BGP, this is the IGP metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Next hop</b>    | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>AS path</b>     | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul>                                                                                                                                                                                                          |

## Sample Output

### show route terse

```
user@host> show route terse
inet.0: 12 destinations, 12 routes (11 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 0.0.0.0/0 S 5 >111.222.5.254
* 1.0.0.1/32 D 0 >at-5/3/0.0
* 1.0.0.2/32 L 0 Local
* 12.12.12.21/32 L 0 Reject
* 13.13.13.13/32 D 0 >t3-5/2/1.0
* 13.13.13.14/32 L 0 Local
* 13.13.13.21/32 L 0 Local
* 13.13.13.22/32 D 0 >t3-5/2/0.0
 127.0.0.1/32 D 0 >lo0.0
* 111.222.5.0/24 D 0 >fxp0.0
* 111.222.5.81/32 L 0 Local
* 224.0.0.5/32 O 10 1 MultiRecv
```

## CHAPTER 26

# RIP Operational Commands

- `clear rip general-statistics`
- `clear rip statistics`
- `show rip general-statistics`
- `show rip neighbor`
- `show rip statistics`

## clear rip general-statistics

---

|                                                 |                                                                                                                                                                                                         |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 2058</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 2058</a>                                                                                            |
| <b>Syntax</b>                                   | clear rip general-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                    |
| <b>Syntax (EX Series Switch and QFX Series)</b> | clear rip general-statistics                                                                                                                                                                            |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                |
| <b>Description</b>                              | Clear Routing Information Protocol (RIP) general statistics.                                                                                                                                            |
| <b>Options</b>                                  | <b>none</b> —Clear RIP general statistics.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                 | clear                                                                                                                                                                                                   |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"><li>• <a href="#">show rip general-statistics on page 2060</a></li></ul>                                                                                              |
| <b>List of Sample Output</b>                    | <a href="#">clear rip general-statistics on page 2058</a>                                                                                                                                               |
| <b>Output Fields</b>                            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                   |

## Sample Output

### clear rip general-statistics

```
user@host> clear rip general-statistics
```

## clear rip statistics

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 2059</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 2059</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                     | clear rip statistics<br><instance (all   <i>instance-name</i> )><br><logical-system (all   <i>logical-system-name</i> )><br><neighbor><br><peer (all   <i>address</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switches and QFX Series)</b> | clear rip statistics<br><instance (all   <i>instance-name</i> )><br><neighbor>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>                                | Clear RIP statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                    | <p><b>none</b>—Reset RIP counters for all neighbors for all routing instances.</p> <p><b>instance (all   <i>instance-name</i>)</b>—(Optional) Clear RIP statistics for all instances or for the specified routing instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor</b>—(Optional) Clear RIP statistics for the specified neighbor only.</p> <p><b>peer (all   <i>address</i>)</b>—(Optional) Clear RIP statistics for a single peer or all peers.</p> |
| <b>Required Privilege Level</b>                   | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"> <li>• <a href="#">show rip statistics on page 2064</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>                      | <a href="#">clear rip statistics on page 2059</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                              | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## Sample Output

### clear rip statistics

```
user@host> clear rip statistics
```

## show rip general-statistics

|                                                 |                                                                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                           | <a href="#">Syntax on page 2060</a><br><a href="#">Syntax (EX Series Switch and QFX Series) on page 2060</a>                                                                             |
| <b>Syntax</b>                                   | show rip general-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                      |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show rip general-statistics                                                                                                                                                              |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series. |
| <b>Description</b>                              | Display brief Routing Information Protocol (RIP) statistics.                                                                                                                             |
| <b>Options</b>                                  | none—Display brief RIP statistics.<br><br>logical-system (all   <i>logical-system-name</i> )—(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                     |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><a href="#">clear rip general-statistics on page 2058</a></li> </ul>                                                                              |
| <b>List of Sample Output</b>                    | <a href="#">show rip general-statistics on page 2060</a>                                                                                                                                 |
| <b>Output Fields</b>                            | Table 204 on page 2060 lists the output fields for the <b>show rip general-statistics</b> command. Output fields are listed in the approximate order in which they appear.               |

Table 204: show rip general-statistics Output Fields

| Field Name  | Field Description                                      |
|-------------|--------------------------------------------------------|
| bad msgs    | Number of invalid messages received.                   |
| no rcv intf | Number of packets received with no matching interface. |
| curr memory | Amount of memory currently used by RIP.                |
| max memory  | Most memory used by RIP.                               |

## Sample Output

### show rip general-statistics

```
user@host> show rip general-statistics
```

```
RIPv2 I/O info:
 bad msgs : 0
 no recv intf : 0
 curr memory : 0
 max memory : 0
```

## show rip neighbor

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 2062</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 2062</a>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax</b>                                     | <pre>show rip neighbor &lt;instance (all   <i>instance-name</i>)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show rip neighbor &lt;instance (all   <i>instance-name</i>)&gt; &lt;name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                | Display information about RIP neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                    | <p><b>none</b>—Display information about all RIP neighbors for all instances.</p> <p><b>instance (all   <i>instance-name</i>)</b>—(Optional) Display RIP neighbor information for all instances or for only the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>name</b>—(Optional) Display detailed information about only the specified RIP neighbor.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                      | <a href="#">show rip neighbor on page 2063</a><br><a href="#">show rip neighbor (With Demand Circuits Configured) on page 2063</a>                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                              | <a href="#">Table 205 on page 2063</a> lists the output fields for the <b>show rip neighbor</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                              |



Table 205: show rip neighbor Output Fields

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Neighbor</b>            | Name of the RIP neighbor.<br><br><b>NOTE:</b> Beginning with Junos OS Release 11.1, when you configure demand circuits, the output displays a demand circuit (DC) flag next to neighbor interfaces configured for demand circuits.<br><br>If you configure demand circuits at the <b>[edit protocols rip group group-name neighbor neighbor-name]</b> hierarchy level, the output shows only the neighboring interface that you specifically configured as a demand circuit. If you configure demand circuits at the <b>[edit protocols rip group group-name]</b> hierarchy level, all of the interfaces in the group are configured as demand circuits. Therefore, the output shows all of the interfaces in that group as demand circuits. |
| <b>State</b>               | State of the connection: <b>Up</b> or <b>Dn</b> (Down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Source Address</b>      | Source address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Destination Address</b> | Destination address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Send Mode</b>           | Send options: <b>broadcast</b> , <b>multicast</b> , <b>none</b> , or <b>version 1</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Receive Mode</b>        | Type of packets to accept: <b>both</b> , <b>none</b> , <b>version 1</b> , or <b>version 2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>In Met</b>              | Metric added to incoming routes when advertising into RIP routes that were learned from other protocols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Sample Output

### show rip neighbor

```

user@host> show rip neighbor
Neighbor Local Source Destination Send Receive In
----- -
ge-2/3/0.0 Up 192.168.9.105 192.168.9.107 bcast both 1
at-5/1/1.42 Dn (null) (null) mcast v2 only 3
at-5/1/0.42 Dn (null) (null) mcast both 3
at-5/1/0.0 Up 20.0.0.1 224.0.0.9 mcast both 3
so-0/0/0.0 Up 192.168.9.97 224.0.0.9 mcast both 3

```

### show rip neighbor (With Demand Circuits Configured)

```

user@host# show rip neighbor
Neighbor Local Source Destination Send Receive In
----- -
so-0/1/0.0(DC) Up 10.10.10.2 224.0.0.9 mcast both 1
so-0/2/0.0(DC) Up 13.13.13.2 224.0.0.9 mcast both 1

```

## show rip statistics

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                             | <a href="#">Syntax on page 2064</a><br><a href="#">Syntax (EX Series Switches and QFX Series) on page 2064</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                     | <pre>show rip statistics &lt;instance (all   <i>instance-name</i>)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;<i>name</i>&gt; &lt;peer (all   <i>address</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show rip statistics &lt;instance (all   <i>instance-name</i>)&gt; &lt;<i>name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                | Display RIP statistics about messages sent and received on an interface, as well as information received from advertisements from other routing devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                                    | <p><b>none</b>—Display RIP statistics for all routing instances.</p> <p><b>instance (all   <i>instance-name</i>)</b>—(Optional) Display RIP statistics for all instances or for only the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>name</i></b>—(Optional) Display detailed information about only the specified RIP neighbor.</p> <p><b>peer (all   <i>address</i>)</b>—(Optional) Display RIP statistics for a single peer or all peers.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <a href="#">clear rip statistics on page 2059</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>                      | <a href="#">show rip statistics on page 2065</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>                              | <a href="#">Table 206 on page 2065</a> lists the output fields for the <b>show rip statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 206: show rip statistics Output Fields

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RIP info</b>          | <p>Information about RIP on the specified interface:</p> <ul style="list-style-type: none"> <li>• <b>port</b>—UDP port number used for RIP.</li> <li>• <b>update interval</b>—Interval between routing table updates, in seconds.</li> <li>• <b>holddown</b>—Hold-down interval, in seconds.</li> <li>• <b>timeout</b>—Timeout interval, in seconds.</li> <li>• <b>restart in progress</b>—Graceful restart status. Displayed when RIP is or has been in the process of graceful restart.</li> <li>• <b>restart time</b>—Estimated time for the graceful restart to finish, in seconds.</li> <li>• <b>restart will complete in</b>—Remaining time for the graceful restart to finish, in seconds.</li> <li>• <b>rts learned</b>—Number of routes learned through RIP.</li> <li>• <b>rts held down</b>—Number of routes held down by RIP.</li> <li>• <b>rqsts dropped</b>—Number of received request packets that were dropped.</li> <li>• <b>resps dropped</b>—Number of received response packets that were dropped.</li> </ul>                                                                                                                                                             |
| <b>logical-interface</b> | <p>Name of the logical interface and its statistics:</p> <ul style="list-style-type: none"> <li>• <b>routes learned</b>—Number of routes learned on the logical interface.</li> <li>• <b>routes advertised</b>—Number of routes advertised by the logical interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Counter</b>           | <p>List of counter types:</p> <ul style="list-style-type: none"> <li>• <b>Updates Sent</b>—Number of update messages sent.</li> <li>• <b>Triggered Updates Sent</b>—Number of triggered update messages sent.</li> <li>• <b>Responses Sent</b>—Number of response messages sent.</li> <li>• <b>Bad Messages</b>—Number of invalid messages received.</li> <li>• <b>RIPv1 Updates Received</b>—Number of RIPv1 update messages received.</li> <li>• <b>RIPv1 Bad Route Entries</b>—Number of RIPv1 invalid route entry messages received.</li> <li>• <b>RIPv1 Updates Ignored</b>—Number of RIPv1 update messages ignored.</li> <li>• <b>RIPv2 Updates Received</b>—Number of RIPv2 update messages received.</li> <li>• <b>RIPv2 Bad Route Entries</b>—Number of RIPv2 invalid route entry messages received.</li> <li>• <b>RIPv2 Updates Ignored</b>—Number of RIPv2 update messages that were ignored.</li> <li>• <b>Authentication Failures</b>—Number of received update messages that failed authentication.</li> <li>• <b>RIP Requests Received</b>—Number of RIP request messages received.</li> <li>• <b>RIP Requests Ignored</b>—Number of RIP request messages ignored.</li> </ul> |
| <b>Total</b>             | Total number of packets for the selected counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Last 5 min</b>        | Number of packets for the selected counter in the most recent 5-minute period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Last minute</b>       | Number of packets for the selected counter in the most recent 1-minute period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Sample Output

### show rip statistics

```
user@host> show rip statistics so-0/0/0.0
```

RIP info: port 520; update interval: 30s; holddown 180s; timeout 120s  
restart in progress: restart time 60s; restart will complete in 55s  
      rts learned  rts held down  rqsts dropped  resps dropped  
              0              0              0              0

so-0/0/0.0: 0 routes learned; 501 routes advertised

| Counter                 | Total | Last 5 min | Last minute |
|-------------------------|-------|------------|-------------|
| -----                   | ----- | -----      | -----       |
| Updates Sent            | 0     | 0          | 0           |
| Triggered Updates Sent  | 0     | 0          | 0           |
| Responses Sent          | 0     | 0          | 0           |
| Bad Messages            | 0     | 0          | 0           |
| RIPv1 Updates Received  | 0     | 0          | 0           |
| RIPv1 Bad Route Entries | 0     | 0          | 0           |
| RIPv1 Updates Ignored   | 0     | 0          | 0           |
| RIPv2 Updates Received  | 0     | 0          | 0           |
| RIPv2 Bad Route Entries | 0     | 0          | 0           |
| RIPv2 Updates Ignored   | 0     | 0          | 0           |
| Authentication Failures | 0     | 0          | 0           |
| RIP Requests Received   | 0     | 0          | 0           |
| RIP Requests Ignored    | 0     | 0          | 0           |

## CHAPTER 27

# RIPng Operational Commands

- `clear ripng general-statistics`
- `clear ripng statistics`
- `show ripng general-statistics`
- `show ripng neighbor`
- `show ripng statistics`

## clear ripng general-statistics

---

|                                    |                                                                                                                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 2068</a><br><a href="#">Syntax (EX Series Switches) on page 2068</a>                                                                                                           |
| <b>Syntax</b>                      | clear ripng general-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                    |
| <b>Syntax (EX Series Switches)</b> | clear ripng general-statistics                                                                                                                                                                            |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                     |
| <b>Description</b>                 | Clear RIP next generation (RIPng) general statistics.                                                                                                                                                     |
| <b>Options</b>                     | <b>none</b> —Clear RIPng general statistics.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | clear                                                                                                                                                                                                     |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"><li>• <a href="#">show ripng general-statistics on page 2070</a></li></ul>                                                                                              |
| <b>List of Sample Output</b>       | <a href="#">clear ripng general-statistics on page 2068</a>                                                                                                                                               |
| <b>Output Fields</b>               | When you enter this command, you are provided feedback on the status of your request.                                                                                                                     |

## Sample Output

### clear ripng general-statistics

```
user@host> clear ripng general-statistics
```

## clear ripng statistics

---

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>            | <a href="#">Syntax on page 2069</a><br><a href="#">Syntax (EX Series Switch) on page 2069</a>                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                    | clear ripng statistics<br><instance   name><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switch)</b> | clear ripng statistics<br><instance   name>                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>       | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                       |
| <b>Description</b>               | Clear RIP next-generation (RIPng) statistics.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                   | <p><b>none</b>—Reset RIPng counters for all neighbors for all routing instances.</p> <p><b>instance</b>—(Optional) Reset RIPng counters for the specified instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>name</b>—(Optional) Reset RIPng counters for the specified neighbor.</p> |
| <b>Required Privilege Level</b>  | clear                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>     | <ul style="list-style-type: none"> <li>• <a href="#">show ripng statistics on page 2074</a></li> </ul>                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>     | <a href="#">clear ripng statistics on page 2069</a>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>             | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                       |

## Sample Output

### clear ripng statistics

```
user@host> clear ripng statistics
```

## show ripng general-statistics

|                                  |                                                                                                                                                                                              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>            | <a href="#">Syntax on page 2070</a><br><a href="#">Syntax (EX Series Switch) on page 2070</a>                                                                                                |
| <b>Syntax</b>                    | show ripng general-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                        |
| <b>Syntax (EX Series Switch)</b> | show ripng general-statistics                                                                                                                                                                |
| <b>Release Information</b>       | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                        |
| <b>Description</b>               | Display general RIP next-generation (RIPng) statistics.                                                                                                                                      |
| <b>Options</b>                   | none—Display general RIPng statistics.<br><br>logical-system (all   <i>logical-system-name</i> )—(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>  | view                                                                                                                                                                                         |
| <b>Related Documentation</b>     | <ul style="list-style-type: none"> <li>• <a href="#">clear ripng general-statistics on page 2068</a></li> </ul>                                                                              |
| <b>List of Sample Output</b>     | <a href="#">show ripng general-statistics on page 2070</a>                                                                                                                                   |
| <b>Output Fields</b>             | <a href="#">Table 207 on page 2070</a> lists the output fields for the <b>show ripng general-statistics</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 207: show ripng general-statistics Output Fields**

| Field Name  | Field Description                                      |
|-------------|--------------------------------------------------------|
| bad msgs    | Number of invalid messages received.                   |
| no rcv intf | Number of packets received with no matching interface. |
| curr memory | Amount of memory currently used by RIPng.              |
| max memory  | Most memory used by RIPng.                             |

## Sample Output

### show ripng general-statistics

```

user@host> show ripng general-statistics
RIPng I/O info:
 bad msgs : 0
 no rcv intf : 0

```



```
curr memory : 0
max memory : 0
```

## show ripng neighbor

|                                  |                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>            | <a href="#">Syntax on page 2072</a><br><a href="#">Syntax (EX Series Switch) on page 2072</a>                                                                                                                                                                                                                                    |
| <b>Syntax</b>                    | <pre>show ripng neighbor &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;<i>name</i>&gt;</pre>                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switch)</b> | <pre>show ripng neighbor &lt;<i>name</i>&gt;</pre>                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>       | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                            |
| <b>Description</b>               | Display information about RIP next-generation (RIPng) neighbors.                                                                                                                                                                                                                                                                 |
| <b>Options</b>                   | <p><b>none</b>—Display information about all RIPng neighbors.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>name</i></b>—(Optional) Display detailed information about a specific RIPng neighbor.</p> |
| <b>Required Privilege Level</b>  | view                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>     | <a href="#">show ripng neighbor on page 2073</a>                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>             | <a href="#">Table 208 on page 2072</a> lists the output fields for the <b>show ripng neighbor</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                               |

**Table 208: show ripng neighbor Output Fields**

| Field Name                 | Field Description                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Neighbor</b>            | Name of RIPng neighbor.                                                                                    |
| <b>State</b>               | State of the connection: <b>Up</b> or <b>Dn</b> (Down).                                                    |
| <b>Source Address</b>      | Source address.                                                                                            |
| <b>Destination Address</b> | Destination address.                                                                                       |
| <b>Send</b>                | Send options: <b>broadcast</b> , <b>multicast</b> , <b>none</b> , <b>version 1</b> , or <b>yes</b> .       |
| <b>Recv</b>                | Type of packets to accept: <b>both</b> , <b>none</b> , <b>version 1</b> , or <b>yes</b> .                  |
| <b>In Met</b>              | Metric added to incoming routes when advertising into RIPng routes that were learned from other protocols. |

Sample Output

show ripng neighbor

```
user@host> show ripng neighbor
```

| Neighbor   | State | Source Address           | Dest Address | Send  | Recv  | In Met |
|------------|-------|--------------------------|--------------|-------|-------|--------|
| -----      | ----- | -----                    | -----        | ----- | ----- | -----  |
| fe-0/0/2.0 | Up    | fe80::290:69ff:fe68:b002 | ff02::9      | yes   | yes   | 1      |

## show ripng statistics

|                                  |                                                                                                                                                                                                                                                                                                                               |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>            | <a href="#">Syntax on page 2074</a><br><a href="#">Syntax (EX Series Switch) on page 2074</a>                                                                                                                                                                                                                                 |
| <b>Syntax</b>                    | show ripng statistics<br><logical-system (all   <i>logical-system-name</i> )><br>< <i>name</i> >                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switch)</b> | show ripng statistics<br>< <i>name</i> >                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>       | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                         |
| <b>Description</b>               | Display RIP next generation (RIPng) statistics about messages sent and received on an interface, as well as information received from advertisements from other routing devices.                                                                                                                                              |
| <b>Options</b>                   | <p><b>none</b>—Display RIPng statistics for all neighbors.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>name</i></b>—(Optional) Display detailed information about a specific RIPng neighbor.</p> |
| <b>Required Privilege Level</b>  | view                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>     | <ul style="list-style-type: none"> <li>• <a href="#">clear ripng statistics on page 2069</a></li> </ul>                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>     | <a href="#">show ripng statistics on page 2075</a>                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>             | Table 209 on page 2074 lists the output fields for the <b>show ripng statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                          |

Table 209: show ripng statistics Output Fields

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RIPng Info</b> | Information about RIPng on the specified interface: <ul style="list-style-type: none"> <li>• <b>port</b>—UDP port number used for RIPng.</li> <li>• <b>holddown</b>—Hold-down interval, in seconds.</li> <li>• <b>rts learned</b>—Number of routes learned through RIPng.</li> <li>• <b>rts held down</b>—Number of routes held down by RIPng.</li> <li>• <b>rqsts dropped</b>—Number of received request packets that were dropped.</li> <li>• <b>resps dropped</b>—Number of received response packets that were dropped.</li> <li>• <b>restart</b>—Graceful restart status. Displayed when RIPng is or has been in the process of graceful restart.</li> </ul> |

Table 209: show ripng statistics Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-interface</i> | Name of the logical interface and its statistics: <ul style="list-style-type: none"> <li><b>routes learned</b>—Number of routes learned on the logical interface.</li> <li><b>routes advertised</b>—Number of routes advertised by the logical interface.</li> <li><b>timeout</b>—Timeout interval, in seconds.</li> <li><b>update interval</b>—Interval between routing table updates, in seconds.</li> </ul>                                                                                                                                                                                                                                                                                                                                                    |
| <b>Counter</b>           | List of counter types: <ul style="list-style-type: none"> <li><b>Updates Sent</b>—Number of update messages sent.</li> <li><b>Triggered Updates Sent</b>—Number of triggered update messages sent.</li> <li><b>Responses Sent</b>—Number of response messages sent.</li> <li><b>Bad Messages</b>—Number of invalid messages received.</li> <li><b>Updates Received</b>—Number of RIPng update messages received.</li> <li><b>Bad Route Entries</b>—Number of RIPng invalid route entry messages received.</li> <li><b>Updates Ignored</b>—Number of RIPng update messages ignored.</li> <li><b>RIPng Requests Received</b>—Number of RIPng request messages received.</li> <li><b>RIPng Requests Ignored</b>—Number of RIPng request messages ignored.</li> </ul> |
| <b>Total</b>             | Total number of packets for the selected counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Last 5 min</b>        | Number of packets for the selected counter in the most recent 5-minute period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Last minute</b>       | Number of packets for the selected counter in the most recent 1-minute period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### show ripng statistics

```

user@host> show ripng statistics
RIPng info: port 521; holddown 120s;
 rts learned rts held down rqsts dropped resps dropped
 0 0 0 0

so-0/1/3.0: 0 routes learned; 1 routes advertised; timeout 180s; update interval
20s
Counter Total Last 5 min Last minute

Updates Sent 934 16 4
Triggered Updates Sent 1 0 0
Responses Sent 0 0 0
Bad Messages 0 0 0
Updates Received 0 0 0
Bad Route Entries 0 0 0
Updates Ignored 0 0 0
RIPng Requests Received 0 0 0
RIPng Requests Ignored 0 0 0

```




## CHAPTER 28

# Firewall Filter Operational Commands

- `clear firewall`
- `show firewall`
- `show firewall filter version`
- `show firewall log`
- `show firewall prefix-action-stats`
- `show firewall templates-in-use`
- `show policer`

## clear firewall

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            | <a href="#">Syntax on page 2078</a><br><a href="#">Syntax (EX Series Switches) on page 2078</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | clear firewall (all   counter <i>counter-name</i>   filter <i>filter-name</i>   log (all   <i>logical-system-name</i> )   logical-system <i>logical-system-name</i> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax (EX Series Switches)</b>                                                                                                                                                                                                                                                                                                                                                                                                                               | clear firewall (all   counter <i>counter-name</i>   filter <i>filter-name</i>   log (all   <i>logical-system-name</i> )   policer counter (all   counter-id <i>counter-index</i> ))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>logical-system</b> option introduced in Junos OS Release 9.3.</p> <p><b>log</b> option introduced before Junos OS Release 11.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Clear statistics about configured firewall filters.</p> <p>When you clear the counters of a filter, this impacts not only the counters shown by the CLI, but also the ones tracked by SNMP2.</p> <p>Subscriber management uses firewall filters to capture and report the volume-based service accounting counters that are used for subscriber billing. The <b>clear firewall</b> command also clears the service accounting counters that are reported to the RADIUS accounting server. For this reason, you must be cautious in specifying which firewall statistics you want to clear.</p>                                                                                                                                 |
| <div>  <p><b>NOTE:</b> The <b>clear firewall</b> command cannot be used to clear the Routing Engine filter counters on a backup Routing Engine that is enabled for graceful Routing Engine switchover (GRES).</p> </div>                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>If you clear statistics for firewall filters that are applied to Trio-based DPCs and that also use the <b>prefix-action</b> action on matched packets, wait at least 5 seconds before you enter the <b>show firewall prefix-action-stats</b> command. A 5-second pause between issuing the <b>clear firewall</b> and <b>show firewall prefix-action-stats</b> commands avoids a possible timeout of the <b>show firewall prefix-action-stats</b> command.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>all</b>—Clear the packet and byte counts for all filters. On EX Series switches, this option also clears the packet counts for all policer counters.</p> <p><b>counter <i>counter-name</i></b>—Clear the packet and byte counts for a filter counter that has been configured with the counter firewall filter action.</p> <p><b>filter <i>filter-name</i></b>—Clear the packet and byte counts for the specified firewall filter.</p> <p><b>log (all   <i>logical-system-name</i>)</b>—Clear log entries for IPv4 firewall filters that have <b>then log</b> as an action. Use <b>log all</b> to clear all log entries or <b>log <i>logical-system-name</i></b> to clear log entries for the specified logical system.</p> |



**logical-system** *logical-system-name*—Clear the packet and byte counts for the specified logical system.

**policer counter** (**all** | **counter-id** *counter-index*)—(EX8200 switches only) Clear all policer counters using the **policer counter all** command, or clear a specific policer counter using the **policer counter counter-id** *counter-index* command. The value of *counter-index* can be 0, 1, or 2.

**Required Privilege Level**

clear

**Related Documentation**

- [show firewall on page 2080](#)

**List of Sample Output**

[clear firewall all on page 2079](#)

[clear firewall \(counter counter-name\) on page 2079](#)

[clear firewall \(filter filter-name\) on page 2079](#)

[clear firewall \(policer counter all\) \(EX8200 Switch\) on page 2079](#)

[clear firewall \(policer counter counter-id counter-index\) \(EX8200 Switch\) on page 2079](#)

## Sample Output

clear firewall all

```
user@host> clear firewall all
```

clear firewall (counter counter-name)

```
user@host> clear firewall counter port-filter-counter
```

clear firewall (filter filter-name)

```
user@host> clear firewall filter ingress-port-filter
```

clear firewall (policer counter all) (EX8200 Switch)

```
user@switch> clear firewall policer counter all
```

clear firewall (policer counter counter-id counter-index) (EX8200 Switch)

```
user@switch> clear firewall policer counter counter-id 0
```

## show firewall

---

**List of Syntax**   [Syntax on page 2080](#)  
                          [Syntax \(EX Series Switches\) on page 2080](#)

**Syntax**   `show firewall`  
              `<counter counter-name>`  
              `<detail>`  
              `<filter filter-name>`  
              `<log>`  
              `<logical-system (all | logical-system-name)>`  
              `<terse>`

**Syntax (EX Series Switches)**   `show firewall`  
                                      `<counter counter-name>`  
                                      `<detail>`  
                                      `<filter filter-name>`  
                                      `<log <(detail | interface interface-name)>>`  
                                      `<policer counters <(detail | counter-id counter-index <detail>)>>`  
                                      `<terse>`

**Release Information**   Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              Option **logical-system** introduced in Junos OS Release 9.3.  
                              Option **terse** introduced in Junos OS Release 9.4.  
                              Option **policer counters** introduced in Junos OS Release 12.2 for EX Series switches.  
                              Option **detail** introduced in Junos OS Release 12.3 for MX Series switches.

**Description**   Display enhanced statistics and counters for all configured firewall filters.

**Options**   **none**—(Optional) Display statistics and counters for all configured firewall filters and counters. For EX Series switches, this command also displays statistics about all configured policers.

**counter *counter-name***—(Optional) Name of a filter counter.

**detail**—(Optional) Display firewall filter statistics and enhanced policer statistics and counters.

**filter *filter-name***—(Optional) Name of a configured filter.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**log**—(Optional) Display log entries for firewall filters.

**log <(detail | interface *interface-name*)>**—(EX Series switches only) (Optional) Display detailed log entries of firewall activity or log information about a specific interface.

**policer counters <(detail | counter-id *counter-index* <detail>)>**—(EX8200 switches only) (Optional) Display enhanced policer counter statistics in brief or in detail.

**terse**—(Optional) Display firewall filter names only.

**Required Privilege Level** view

**Related Documentation**

- [clear firewall on page 2078](#)
- [show firewall log on page 2089](#)
- *Verifying That Firewall Filters Are Operational*
- *Verifying That Policers Are Operational*
- [show policer on page 2096](#)

**List of Sample Output**

- [show firewall filter \(MX Series Router and EX Series Switch\) on page 2084](#)
- [show firewall filter \(non MX Series Router and EX Series Switch\) on page 2084](#)
- [show firewall filter \(Hierarchical Policer, MX Series with MPC\) on page 2084](#)
- [show firewall filter \(Dynamic Input Filter\) on page 2084](#)
- [show firewall \(Logical Systems\) on page 2084](#)
- [show firewall \(counter counter-name\) on page 2085](#)
- [show firewall log on page 2085](#)
- [show firewall policer counters \(EX8200 Switch\) on page 2085](#)
- [show firewall policer counters \(detail\) \(EX8200 Switch\) on page 2086](#)
- [show firewall policer counters \(counter-id counter-index\) \(EX8200 Switch\) on page 2086](#)
- [show firewall policer counters \(counter-id counter-index detail\) \(EX8200 Switch\) on page 2086](#)
- [show firewall detail on page 2087](#)

**Output Fields** [Table 210 on page 2081](#) lists the output fields for the **show firewall** command. Output fields are listed in the approximate order in which they appear.

**Table 210: show firewall Output Fields**

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Filter</b> | <p>Name of a filter that has been configured with the <b>filter</b> statement at the <b>[edit firewall]</b> hierarchy level.</p> <p>Except on EX Series switches:</p> <ul style="list-style-type: none"> <li>• When an interface-specific filter is displayed, the name of the filter is followed by the full interface name and by either <b>-i</b> for an input filter or <b>-o</b> for an output filter.</li> <li>• When dynamic filters are displayed, the name of the filter is followed by the full interface name and by either <b>-in</b> for an input filter or <b>-out</b> for an output filter. When a logical system-specific filter is displayed, the name of the filter is prefixed with two underscore (__) characters and the name of the logical system (for example, __ls1/filter1).</li> <li>• When a service filter is displayed that uses a service set, the separator between the service-set name and the service-filter name is a semicolon (;).</li> </ul> <p><b>NOTE:</b> For <b>bridge family filter</b>, the <b>ip-protocol</b> match criteria is supported only for IPv4 and not for IPv6. This is applicable for line cards that support the Junos Trio chipset, such as the MX 3D MPC line cards.</p> |

Table 210: show firewall Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Counters</b>              | <p>Display filter counter information:</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of a filter counter that has been configured with the <b>counter</b> firewall filter action.</li> <li>• <b>Bytes</b>—Number of bytes that match the filter term under which the <b>counter</b> action is specified.</li> <li>• <b>Packets</b>—Number of packets that matched the filter term under which the <b>counter</b> action is specified.</li> </ul> <p><b>NOTE:</b> On M and T Series routers, firewall filters cannot count <b>ip-options</b> packets on a per option type and per interface basis. A limited work around is to use the <b>show pfe statistics ip options</b> command to see <b>ip-options</b> statistics on a per Packet Forwarding Engine (PFE) basis. See <i>show pfe statistics ip</i> for sample output.</p> |
| <b>Policers</b>              | <p>Display policer information:</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of policer.</li> <li>• <b>Bytes</b>—(For two-color policers on MX Series routers and EX Series switches, and for hierarchical policers on interfaces hosted on MICs and MPCs in MX Series routers) Number of bytes that match the filter term under which the policer action is specified. This is only the number out-of-specification (out-of-spec) byte counts, not all the bytes in all packets policed by the policer.<br/>For other platforms, this field is blank.</li> <li>• <b>Packets</b>—Number of packets that matched the filter term under which the policer action is specified. This is only the number of out-of-specification (out-of-spec) packet counts, not all packets policed by the policer.</li> </ul>                   |
| <b>Policer Counter Index</b> | (EX8200 switch only) Global management counter ID. The counter ID value ( <i>counter-index</i> ) can be 0, 1, or 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Green</b>                 | (EX8200 switch only) Number of packets within the limits. The number of packets is smaller than the committed information rate (CIR).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Yellow</b>                | (EX8200 switch only) Number of packets partially within the limits. The number of packets is greater than the CIR, but the burst size is within the excess burst size (EBS) limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Discard</b>               | (EX8200 switch only) Number of discarded packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Bytes</b>                 | (EX8200 switch only) Number of green, yellow, red, or discarded packets in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Packets</b>               | (EX8200 switch only) Number of green, yellow, red, or discarded packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Filter name</b>           | (EX8200 switch only) Name of the filter with a term associated to a policer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Term name</b>             | (EX8200 switch only) Name of the term associated with a policer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Policer name</b>          | (EX8200 switch only) Name of the policer that is associated with a global management counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 210: show firewall Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PI-t1      | <ul style="list-style-type: none"><li>• OOS packet statistics for packets that are marked out-of-specification (out-of-spec) by the policer. Changes to all packets that have out-of-spec actions, such as discard, color marking, or forwarding-class, are included in this counter.</li><li>• Offered packet statistics for traffic subjected to policing.</li><li>• Transmitted packet statistics for traffic that is not discarded by the policer. When the policer action is discard, the statistics are the same as the in-spec statistics; when the policer action is non-discard (loss-priority or forwarding-class), the statistics are included in this counter.</li></ul> |

## Sample Output

### show firewall filter (MX Series Router and EX Series Switch)

```
user@host> show firewall filter test
Filter: test
Counters:
Name Bytes Packets
Counter-1 0 0
Counter-2 0 0
Policers:
Name Bytes Packets
Policer-1 2770 70
```

### show firewall filter (non MX Series Router and EX Series Switch)

```
user@host> show firewall filter test
Filter: test
Counters:
Name Bytes Packets
Counter-1 0 0
Counter-2 0 0
Policers:
Name Bytes Packets
Policer-1 70
```

### show firewall filter (Hierarchical Policier, MX Series with MPC)

```
user@host> show firewall filter
FL_V4_PHY-HP-EF-AWARE-Gold=400k-MCAST=200k-Total=1M-ds-10/0/0:2:1-i

Filter: FL_V4_PHY-HP-EF-AWARE-Gold=400k-MCAST=200k-Total=1M-ds-10/0/0:2:1-i
Counters:
Name Bytes Packets
AF1x_counter-ds-10/0/0:2:1-i 0 0
AF2x_counter-ds-10/0/0:2:1-i 25529445976 24500428
AF3x_counter-ds-10/0/0:2:1-i 2182022 39482
AF4x_counter-ds-10/0/0:2:1-i 0 0
BE_counter-ds-10/0/0:2:1-i 0 0
EF_counter-ds-10/0/0:2:1-i 14817044120 12265765
STD_counter-ds-10/0/0:2:1-i 0 0
Policers:
Name Bytes Packets
POL_CE-PE_M=200k-filter-ds-10/0/0:2:1-i 5948099658 5708349
POL_CE-PE_G=400K_R=1M-filter-ds-10/0/0:2:1-i ?????????? 3572794
?? ?????????? ????????
```

### show firewall filter (Dynamic Input Filter)

```
user@host> show firewall filter dfwd-ge-5/0/0.1-in
Filter: dfwd-ge-5/0/0.1-in
Counters:
Name Bytes Packets
c1-ge-5/0/0.1-in 0 0
```

### show firewall (Logical Systems)

```
user@host> show firewall
```

```

Filter: __lr1/test
Counters:
Name Bytes Packets
icmp 420 5
Filter: __default_bpdu_filter__
Filter: __lr1/inet_filter1
Counters:
Name Bytes Packets
inet_tcp_count 0 0
inet_udp_count 0 0
Filter: __lr1/inet_filter2
Counters:
Name Bytes Packets
inet_icmp_count 0 0
inet_pim_count 0 0
Filter: __lr2/inet_filter1
Counters:
Name Bytes Packets
inet_tcp_count 0 0
inet_udp_count 0 0

```

#### show firewall (counter counter-name)

```

user@host> show firewall counter icmp-counter
Filter: ingress-port-voip-class-filter
Counters:
Name Bytes Packets
icmp-counter 0 0

```

#### show firewall log

```

user@host> show firewall log
Log :

Time Filter Action Interface Protocol Src Addr
 Dest Addr
08:00:53 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:52 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:51 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:50 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:49 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:48 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4
08:00:47 pfe R ge-1/0/1.0 ICMP 192.168.3.5
 192.168.3.4

```

#### show firewall policer counters (EX8200 Switch)

```

user@switch> show firewall policer counters
Policer Counter Index 0:
Green: 73 15914
Yellow: 9 1962
Discard: 119 25942

```

```

Policer Counter Index 1:
 Bytes Packets
Green: 0 0
Yellow: 0 0
Discard: 0 0

Policer Counter Index 2:
 Bytes Packets
Green: 0 0
Yellow: 0 0
Discard: 0 0

```

#### show firewall policer counters (detail) (EX8200 Switch)

```

user@switch> show firewall policer counters detail
Policer Counter Index 0:
 Bytes Packets
Green: 73 15914
Yellow: 9 1962
Discard: 119 25942

Filter name Term name Policer name
myfilter polcr-term-1 myfilter-polcr-1
inet-filter-ae ae-snmp policer-1
inet-filter-ae ae-ssh policer-2

Policer Counter Index 1:
 Bytes Packets
Green: 0 0
Yellow: 0 0
Discard: 0 0

Filter name Term name Policer name

Policer Counter Index 2:
 Bytes Packets
Green: 0 0
Yellow: 0 0
Discard: 0 0

Filter name Term name Policer name

```

#### show firewall policer counters (counter-id counter-index) (EX8200 Switch)

```

user@switch> show firewall policer counters counter-id 0
Policer Counter Index 0:
 Bytes Packets
Green: 73 15914
Yellow: 9 1962
Discard: 119 25942

```

#### show firewall policer counters (counter-id counter-index detail) (EX8200 Switch)

```

user@switch> show firewall policer counters counter-id 0 detail
Policer Counter Index 0:
 Bytes Packets
Green: 73 15914
Yellow: 9 1962
Discard: 119 25942

Filter name Term name Policer name

```



|                |              |                  |
|----------------|--------------|------------------|
| myfilter       | polcr-term-1 | myfilter-polcr-1 |
| inet-filter-ae | ae-snmp      | policer-1        |
| inet-filter-ae | ae-ssh       | policer-2        |

### show firewall detail

```
user@host> show firewall detail
Filter: __default_bpdu_filter__
```

```
Filter: foo
```

```
Counters:
```

```
Name
```

```
c1
```

| Bytes    | Packets |
|----------|---------|
| 17652140 | 160474  |

```
Policers:
```

```
Name
```

```
P1-t1
```

| Bytes                  | Packets |
|------------------------|---------|
| 0                      | 18286   |
| 0 18446744073709376546 |         |
| 0 18446744073709358260 |         |

```
 OOS
```

```
 Offered
```

```
 Transmitted
```

## show firewall filter version

|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show firewall filter version <filter-name>                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.2R2.                                                                                                                                                                                                                     |
| <b>Description</b>              | Display the version number of the installed firewall filter in the Routing Engine.                                                                                                                                                                                 |
| <b>Options</b>                  | none—(Optional) Display the version number of all installed firewall filters.<br><br>filter-name—(Optional) Name of a configured filter. If you specify the name of a filter, only the version number of that filter is displayed.                                 |
| <b>Additional Information</b>   | The initial version number is 1. This number increments by one when you modify the firewall filter settings or an associated prefix action. The maximum version number is 4,294,967,295. When the version number reaches 4,294,967,295, this number is reset to 1. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>    | <a href="#">show firewall filter version on page 2088</a>                                                                                                                                                                                                          |
| <b>Output Fields</b>            | <a href="#">Table 211 on page 2088</a> lists the output fields for the <b>show firewall filter version</b> command. Output fields are listed in the approximate order in which they appear.                                                                        |

Table 211: show firewall filter version Output Fields

| Field Name | Field Description                                                                                                         |
|------------|---------------------------------------------------------------------------------------------------------------------------|
| Filter     | Name of a filter that has been configured with the <b>filter</b> statement at the <b>[edit firewall]</b> hierarchy level. |
| Version    | Display the version number of the firewall filter.                                                                        |

## Sample Output

### show firewall filter version

```
user@host> show firewall filter version
Filter version information :
Filter Version
test 10
```

## show firewall log

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 2089</a><br><a href="#">Syntax (EX Series Switches) on page 2089</a>                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                      | <pre>show firewall log &lt;detail&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (<i>logical-system-name</i>   all)&gt;</pre>                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches)</b> | <pre>show firewall log &lt;detail&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>logical-system</b> option introduced in Junos OS Release 9.3.</p>                                                                                                                                                                                          |
| <b>Description</b>                 | Display log information about firewall filters.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                     | <p><b>none</b>—Display log information about firewall filters.</p> <p><b>detail</b>—(Optional) Display detailed information.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display log information about a specific interface.</p> <p><b>logical-system (<i>logical-system-name</i>   all)</b>—(Optional) Perform this operation on all logical systems or on a particular system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>       | <a href="#">show firewall log on page 2090</a><br><a href="#">show firewall log detail on page 2090</a>                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>               | <p><a href="#">Table 212 on page 2089</a> lists the output fields for the <b>show firewall log</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                           |

**Table 212: show firewall log Output Fields**

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time of Log</b> | Time that the event occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Filter</b>      | <ul style="list-style-type: none"> <li>Displays the name of a configured firewall filter or service filter only if the packet hit the filter's <b>log</b> action in a kernel filter (in the control plane). For any traffic that reaches the Routing Engine, the packets hit the <b>log</b> action in the kernel.</li> <li>For all other logged packets (packet hit the filter's <b>log</b> action in the Packet Forwarding Engine), this field displays <b>pfe</b> instead of a configured filter name.</li> </ul> |

Table 212: show firewall log Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Filter Action       | Filter action: <ul style="list-style-type: none"> <li>• <b>A</b>—Accept</li> <li>• <b>D</b>—Discard</li> <li>• <b>R</b>—Reject</li> </ul>                                                                                                                                                                                                                     |
| Name of Interface   | <ul style="list-style-type: none"> <li>• Displays a physical interface name if the packet arrived at a port on a line card.</li> <li>• Displays <b>local</b> if the packet was generated by the device's internal Ethernet interface, <b>em1</b> or <b>fxp1</b>, which connects the Routing Engine with the router's packet-forwarding components.</li> </ul> |
| Name of protocol    | Packet's protocol name: <b>egp</b> , <b>gre</b> , <b>icmp</b> , <b>ipip</b> , <b>ospf</b> , <b>pim</b> , <b>rsvp</b> , <b>tcp</b> , or <b>udp</b> .                                                                                                                                                                                                           |
| Packet length       | Length of the packet.                                                                                                                                                                                                                                                                                                                                         |
| Source address      | Packet's source address.                                                                                                                                                                                                                                                                                                                                      |
| Destination address | Packet's destination address and port.                                                                                                                                                                                                                                                                                                                        |

## Sample Output

### show firewall log

```

user@host>show firewall log
Time Filter Action Interface Protocol Src Addr Dest Addr

13:10:12 pfe D rlsq0.902 ICMP 180.1.177.2 180.1.177.1
13:10:11 pfe D rlsq0.902 ICMP 180.1.177.2 180.1.177.1

```

### show firewall log detail

```

user@host> show firewall log detail
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0Name of protocol: TCP, Packet Length: 50824, Source address:
172.17.22.108:829,
Destination address: 192.168.70.66:513
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0
Name of protocol: TCP, Packet Length: 1020, Source address: 172.17.22.108:829,
Destination address: 192.168.70.66:513
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0
Name of protocol: TCP, Packet Length: 49245, Source address: 172.17.22.108:829,
Destination address: 192.168.70.66:513
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0
Name of protocol: TCP, Packet Length: 49245, Source address: 172.17.22.108:829,
Destination address: 192.168.70.66:513
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0

```

```
Name of protocol: TCP, Packet Length: 49245, Source address: 172.17.22.108:829,
Destination address: 192.168.70.66:513
Time of Log: 2004-10-13 10:37:17 PDT, Filter: f, Filter action: accept, Name of
interface: fxp0.0
Name of protocol: TCP, Packet Length: 49245, Source address: 172.17.22.108:829,
Destination address: 192.168.70.66:513
....
```

## show firewall prefix-action-stats

---

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                | <a href="#">Syntax (filter-specific mode) on page 2092</a><br><a href="#">Syntax (term-specific mode) on page 2092</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Syntax (filter-specific mode) | show firewall prefix-action-stats filter <i>filter-name</i> prefix-action <i>prefix-action-name</i> <from <i>number</i> to <i>number</i> > <logical-system ( <i>logical-system-name</i>   all)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Syntax (term-specific mode)   | show firewall prefix-action-stats filter <i>filter-name</i> prefix-action <i>prefix-action-name-term-name</i> <from <i>number</i> to <i>number</i> > <logical-system ( <i>logical-system-name</i>   all)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Release Information           | Command introduced before Junos OS Release 7.4.<br><b>logical-system</b> option introduced in Junos OS Release 9.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description                   | <p>Display prefix action statistics about configured firewall filters.</p> <p>If you clear statistics for firewall filters that are applied to MPCs and that also use the <b>prefix-action</b> action on matched packets, wait at least 5 seconds before you enter the <b>show firewall prefix-action-stats</b> command. A 5-second pause between issuing the <b>clear firewall</b> and <b>show firewall prefix-action-stats</b> commands avoids a possible timeout of the <b>show firewall prefix-action-stats</b> command.</p> <p>By default, policers operate in <i>term-specific</i> mode.</p> <p>See <i>Filter-Specific Policer Overview</i> for information about how to configure policers in <i>filter-specific</i> mode.</p> |
| Options                       | <p><b>filter <i>filter-name</i></b>—Name of a filter.</p> <p><b>prefix-action <i>prefix-action-name</i></b>—Name of a prefix action.</p> <p><b>from <i>number</i> to <i>number</i></b>—(Optional) Starting and ending counter or policer.</p> <p><b>logical-system (<i>logical-system-name</i>   all)</b>—(Optional) Perform this operation on all logical systems or on a particular system.</p>                                                                                                                                                                                                                                                                                                                                     |
| Required Privilege Level      | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Related Documentation         | <ul style="list-style-type: none"><li>• <a href="#">clear firewall on page 2078</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| List of Sample Output         | <a href="#">show firewall prefix-action-stats on page 2093</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Output Fields                 | <a href="#">Table 213 on page 2093</a> lists the output fields for the <b>show firewall prefix-action-stats</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 213: show firewall prefix-action-stats Output Fields

| Field Name    | Field Description                                                                                                                                                                                           |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Filter</b> | Filter name.<br><br>Filters configured for logical systems include the name of the filter prefixed with the two underscore characters (__) and the name of the logical system (for example, __ls1/filter1). |

## Sample Output

The following sample output assumes that the policer *act1* is in term mode and that there is a term named *term1* configured in the firewall filter *test*.

### show firewall prefix-action-stats

```

user@host> show firewall prefix-action-stats filter test prefix-action act1-term1 from 0 to 9
Filter: test
Counters:
Name Bytes Packets
act1-0 0 0
act1-1 0 0
act1-2 0 0
act1-3 0 0
act1-4 0 0
act1-5 0 0
act1-6 0 0
act1-7 0 0
act1-8 0 0
act1-9 0 0
Policers:
Name Bytes Packets
act1-0 0 0
act1-1 0 0
act1-2 0 0
act1-3 0 0
act1-4 0 0
act1-5 0 0
act1-6 0 0
act1-7 0 0
act1-8 0 0
act1-9 0 0

```

## show firewall templates-in-use

---

|                          |                                                                                                                                                                                               |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | show firewall templates-in-use                                                                                                                                                                |
| Release Information      | Command introduced in Junos OS Release 12.3.                                                                                                                                                  |
| Description              | Display the names of configured filter templates that are currently in use by dynamic subscribers and the number of times each template is referenced.                                        |
| Required Privilege Level | view                                                                                                                                                                                          |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">clear firewall on page 2078</a></li><li>• <a href="#">show firewall log on page 2089</a></li></ul>                                        |
| List of Sample Output    | <a href="#">show firewall templates-in-use on page 2095</a>                                                                                                                                   |
| Output Fields            | <a href="#">Table 214 on page 2094</a> lists the output fields for the <b>show firewall templates-in-use</b> command. Output fields are listed in the approximate order in which they appear. |

Table 214: show firewall templates-in-use Output Fields

| Field Name      | Field Description                                                                                                                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Filter Template | Name of a filter that has been configured using the <b>filter</b> statement at either the <b>[edit firewall]</b> or <b>[edit dynamic-profiles <i>profile-name</i> firewall]</b> hierarchy and is being used as a template for dynamic subscriber filtering. |
| Reference Count | Number of times the filter has been referenced by subscribers accessing the network.                                                                                                                                                                        |



## Sample Output

### show firewall templates-in-use

```
user@host> show firewall templates-in-use
```

| Filter Template | Dynamic Subscribers | Reference Counts |
|-----------------|---------------------|------------------|
| -----           |                     | -----            |
| egressFilter    |                     | 10               |
| ingressFilter   |                     | 10               |
| dfilter         |                     | 5                |
| dfilter-pol     |                     | 5                |

## show policer

|                                 |                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show policer<br><detail><br><policer-name>                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Option <b>detail</b> introduced in Junos OS Release 12.3.                                                                                                                                                                    |
| <b>Description</b>              | Display the number of policed packets for a given policer or an aggregate policer. An aggregate policer is an aggregate of different policers on the same logical interface.                                                                                                    |
| <b>Options</b>                  | <b>none</b> —Display the number of policed packets for all configured policers.<br><br><b>detail</b> —(Optional) Display enhanced statistics and counters for policers.<br><br><b>policer-name</b> —(Optional) Display the number of policed packets for the specified policer. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>    | <a href="#">show policer (MX Series) on page 2097</a><br><a href="#">show policer (non MX Series Router) on page 2097</a><br><a href="#">show policer (Aggregate Policar, non MX Series Router) on page 2097</a><br><a href="#">show policer detail on page 2098</a>            |
| <b>Output Fields</b>            | <a href="#">Table 215 on page 2096</a> lists the output fields for the <b>show policer</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                     |

**Table 215: show policer Output Fields**

| Field Name     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>    | Name of the policer.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Bytes</b>   | <ul style="list-style-type: none"> <li>(For two-color policers on MX Series routers, and for hierarchical policers on MS-DPC, MIC, and MPC interfaces on MX Series routers)—Total number of bytes policed by the specified policer. For other combinations of policer type, device, and line card type, this field is blank.</li> <li>(T Series and M10i)—Not applicable. The Bytes information is not displayed.</li> </ul> |
| <b>Packets</b> | Total number of packets policed by the specified policer.                                                                                                                                                                                                                                                                                                                                                                    |

Table 215: show policer Output Fields (*continued*)

| Field Name     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Policer detail | <ul style="list-style-type: none"> <li>OOS packet statistics for packets that are marked out-of-specification by the policer. Changes to all packets that have out-of-specification actions, such as discard, color marking, or forwarding-class, are included in this counter.</li> <li>Offered packet statistics for traffic subjected to policing.</li> <li>Transmitted packet statistics for traffic that is not discarded by the policer. When the policer action is discard, the statistics are the same as the within-specification statistics; when the policer action is non-discard (loss-priority or forwarding-class), the statistics are included in this counter.</li> </ul> |

## Sample Output

### show policer (MX Series)

```

user@host> show policer
Policers:

```

| Name                        | Bytes    | Packets |
|-----------------------------|----------|---------|
| __default_arp_policer__     | 314520   | 5242    |
| pol-2M-ge-1/2/0.1-inet-i    | 10372300 | 103723  |
| pol-2M-ge-1/2/0.1-inet6-i   | 7727800  | 77278   |
| pol-2M-ge-1/2/0.1-mp1s-i    | 7070336  | 67984   |
| pol-2M-ge-1/2/0.1001-vpls-i | 65153700 | 651537  |
| pol-2M-ge-1/2/0.2001-vpls-i | 65180900 | 651809  |
| pol-2M-ge-1/2/0.3001-ccc-i  | 62202144 | 647939  |

### show policer (non MX Series Router)

```

user@host> show policer
Policers:

```

| Name                        | Bytes | Packets |
|-----------------------------|-------|---------|
| __default_arp_policer__     | NA    | 5242    |
| pol-2M-ge-1/2/0.1-inet-i    | NA    | 103723  |
| pol-2M-ge-1/2/0.1-inet6-i   | NA    | 77278   |
| pol-2M-ge-1/2/0.1-mp1s-i    | NA    | 67984   |
| pol-2M-ge-1/2/0.1001-vpls-i | NA    | 651537  |
| pol-2M-ge-1/2/0.2001-vpls-i | NA    | 651809  |
| pol-2M-ge-1/2/0.3001-ccc-i  | NA    | 647939  |

### show policer (Aggregate Policar, non MX Series Router)

```

user@host> show policer
Policers:

```

| Name                    | Bytes | Packets |
|-------------------------|-------|---------|
| __default_arp_policer__ | NA    | 0       |
| P1-ae0.0-log_int-o      | NA    | 0       |
| P2-ge-7/0/2.0-inet-o    | NA    | 0       |
| P2-ge-7/0/2.0-inet6-o   | NA    | 0       |
| __policer_tmpl__-term   | NA    | 0       |
| __policer_tmpl__-fc0    | NA    | 0       |
| __policer_tmpl__-fc0    | NA    | 0       |
| __policer_tmpl__-fc1    | NA    | 0       |
| __policer_tmpl__-fc0    | NA    | 0       |
| __policer_tmpl__-fc1    | NA    | 0       |

|                      |    |   |
|----------------------|----|---|
| __policer_tmpl__-fc2 | NA | 0 |
| __policer_tmpl__-fc0 | NA | 0 |
| __policer_tmpl__-fc1 | NA | 0 |
| __policer_tmpl__-fc2 | NA | 0 |
| __policer_tmpl__-fc3 | NA | 0 |

#### show policer detail

```
user@host> show policer detail
```

Policers:

| Name                    | Bytes | Packets |
|-------------------------|-------|---------|
| __default_arp_policer__ |       |         |
| OOS                     | 0     | 0       |
| Offered                 | 0     | 496     |
| Transmitted             | 0     | 496     |
| P1-xe-1/0/0.0-inet-i    |       |         |
| OOS                     | 0     | 11329   |
| Offered                 | 0     | 111188  |
| Transmitted             | 0     | 99859   |

## CHAPTER 29

# Layer 2 Bridging and Switching Operational Commands

- clear bridge mac-table
- clear error bpdu interface
- clear error mac-rewrite
- show bridge domain
- show bridge flood
- show bridge mac-table
- show bridge statistics
- show l2-learning global-information
- show l2-learning global-mac-count
- show l2-learning instance
- show l2-learning interface
- show mac-rewrite interface

## clear bridge mac-table

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear bridge mac-table</code><br><code>&lt;bridge-domain (all   <i>bridge-domain-name</i>)&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;learning-vlan id (all-vlan   <i>learning-vlan-id</i>)&gt;</code><br><code>&lt;mac-address&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | (MX Series routers only) Clear learned Layer 2 address information from the media access control (MAC) address table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>none</b>—Clear all learned Layer 2 address information from the MAC address table.</p> <p><b>bridge-domain (all   <i>bridge-domain-name</i>)</b>—(Optional) Clear learned Layer 2 MAC addresses for all bridging domains or for the specified bridging domain.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear learned Layer 2 MAC addresses for the specified routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear learned Layer 2 MAC addresses for the specified interface.</p> <p><b>learning-vlan-id (all-vlan   <i>learning-vlan-id</i>)</b>—(Optional) Clears learned Layer 2 MAC addresses for all VLANs or for the specified VLAN.</p> <p><b>mac-address</b>—(Optional) Clear the specified learned Layer 2 address from the MAC address table.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">clear bridge mac-table on page 2100</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### Sample Output

#### clear bridge mac-table

```
user@host> clear bridge mac-table
```

## clear error bpdu interface

---

|                                 |                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear error bpdu interface <i>interface-name</i></code>                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.4.                                                                                                                                                                                                                                     |
| <b>Description</b>              | Clear a bridge protocol data unit (BPDU) error condition caused by the detection of a possible bridging loop from Spanning Tree Protocol (STP) operation.                                                                                                                       |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring BPDU Protection for Spanning-Tree Instance Interfaces</i></li><li>• <i>Configuring BPDU Protection on All Edge Ports</i></li><li>• <i>Unblocking an Interface That Receives BPDUs in Error (CLI Procedure)</i></li></ul> |
| <b>List of Sample Output</b>    | <a href="#">clear error bpdu interface on page 2101</a>                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                           |

## Sample Output

### clear error bpdu interface

```
user@host> clear error bpdu interface ge-1/1/1
```

## clear error mac-rewrite

---

|                                 |                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear error mac-rewrite</code><br><code>&lt;interface <i>interface-name</i>&gt;</code>                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.1.                                                                                                                                                                                                                  |
| <b>Description</b>              | (MX Series routers only) Clear a MAC rewrite error condition caused by the reception of tunneled Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunk Protocol (VTP) packets on an interface with Layer 2 protocol tunneling enabled. |
| <b>Options</b>                  | <code>interface <i>interface-name</i></code> —(Optional) Clear the MAC rewrite error condition for the specified interface.                                                                                                                                  |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>    | <a href="#">clear error mac-rewrite interface on page 2102</a>                                                                                                                                                                                               |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                        |

## Sample Output

### clear error mac-rewrite interface

```
user@host> clear error mac-rewrite interface ge-1/0/1
```



## show bridge domain

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show bridge domain &lt;brief   detail   extensive&gt; &lt;bridge-domain (all   domain-name)&gt; &lt;instance instance-name&gt; &lt;operational&gt;</pre>                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | (MX Series routers only) Display bridge domain information.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Display information for all bridge domains.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>bridge-domain (all   domain-name)</b>— (Optional) Display information about all bridge domains or the specified bridge domain.</p> <p><b>instance instance-name</b>—(Optional) Display information for the specified routing instance.</p> <p><b>operational</b>—(Optional) Display information for the operational routing instances.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show bridge domain on page 2103</a><br><a href="#">show bridge domain brief on page 2103</a><br><a href="#">show bridge domain detail on page 2103</a>                                                                                                                                                                                                                                                                                                                                         |

## Sample Output

### show bridge domain

```
user@host> show bridge domain
Instance Primary Table Bridging Domain Type Active
vs1 bridge.0 vlan100 bridge 2
vs1 bridge.0 vlan200 bridge 0
```

### show bridge domain brief

```
user@host> show bridge domain brief
Instance Primary Table Bridging Domain Type Active
vs1 bridge.0 vlan100 bridge 2
vs1 bridge.0 vlan200 bridge 0
```

### show bridge domain detail

```
user@host> show bridge domain detail
```

```
Routing Instance:vs1
 Bridging Domain:vlan100
 Router ID: 0.0.0.0
 Type: bridge State: Active
 Interfaces:
 ge-11/0/3.0
 ge-11/1/4.100
 ge-11/1/1.100
 ge-11/1/0.100
 xe-10/2/0.100
 xe-10/0/0.100
 Tables:
 bridge.0 : 2 macs (2 active)
Routing Instance:vs1
 Bridging Domain:vlan200
 Router ID: 0.0.0.0
 Type: bridge State: Active
 Interfaces:
 ge-11/1/0.200
 ge-11/1/1.200
 ge-11/1/4.200
 xe-10/0/0.200
 xe-10/2/0.200
 Tables:
 bridge.0 : 0 macs (0 active)
```

## show bridge flood

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show bridge flood &lt;brief   detail   extensive&gt; &lt;bridge-domain <i>domain-name</i>&gt; &lt;event-queue&gt; &lt;instance <i>instance-name</i>&gt; &lt;route (all-ce-flood   all ve-flood   alt-root-flood   bd-flood   mlp-flood   re-flood)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | (MX Series routers only) Display bridging flooding information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Display all bridging flooding information for all bridging domains.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>bridge-domain <i>domain-name</i></b>—(Optional) Display bridging flooding information for the specified bridge domain.</p> <p><b>event-queue</b>—(Optional) Display the queue of pending bridge flood events.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display bridging flooding information for the specified routing instance.</p> <p><b>route (all-ce-flood   all ve-flood   alt-root-flood   bd-flood   mlp-flood   re-flood)</b>—(Optional) Display the following:</p> <ul style="list-style-type: none"> <li><b>all-ce-flood</b>—Display the route for flooding traffic to all customer edge routers if <b>no-local-switching</b> is enabled.</li> <li><b>all-ve-flood</b>—Display the route for flooding traffic to all VPLS edge routers if <b>no-local-switching</b> is enabled.</li> <li><b>alt-root-flood</b>—Display the Spanning Tree Protocol (STP) alt-root flooding route used for the interface.</li> <li><b>bd-flood</b>—Display the route for flooding traffic of a bridge domain if <b>no-local-switching</b> is not enabled.</li> <li><b>mlp-flood</b>—Display the route for flooding traffic to MAC learning chips.</li> <li><b>re-flood</b>—Display the route for Routing Engine flooding to all interfaces.</li> </ul> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show bridge flood on page 2106</a><br><a href="#">show bridge flood brief on page 2106</a><br><a href="#">show bridge flood detail on page 2106</a><br><a href="#">show bridge flood extensive on page 2107</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | to be provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Sample Output

## show bridge flood

```

user@host> show bridge flood
Name: __juniper_private1__
CEs: 0
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex
 0x36/16 MLP_FLOOD __vs1+vlan100__ flood 426
 0x3a/16 MLP_FLOOD __vs1+vlan200__ flood 428
Name: vs1::vlan100
CEs: 6
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex
 0x35/16 ALL_FLOOD __vs1+vlan100__ flood 425
 0x35/16 RE_FLOOD __vs1+vlan100__ flood 425
 0x3780/17 ALT_ROOT_RT ge-11/0/3.0 flood 425
 0x3b80/17 ALT_ROOT_RT ge-11/1/4.100 flood 425
 0x3c80/17 ALT_ROOT_RT ge-11/1/1.100 flood 425
 0x3d80/17 ALT_ROOT_RT ge-11/1/0.100 flood 425
 0x3e80/17 ALT_ROOT_RT xe-10/2/0.100 flood 425
 0x3f80/17 ALT_ROOT_RT xe-10/0/0.100 flood 425
Name: vs1::vlan200
CEs: 5
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex
 0x39/16 ALL_FLOOD __vs1+vlan200__ flood 427
 0x39/16 RE_FLOOD __vs1+vlan200__ flood 427
 0x4180/17 ALT_ROOT_RT ge-11/1/0.200 flood 427
 0x4080/17 ALT_ROOT_RT ge-11/1/1.200 flood 427
 0x4280/17 ALT_ROOT_RT ge-11/1/4.200 flood 427
 0x4480/17 ALT_ROOT_RT xe-10/0/0.200 flood 427
 0x4380/17 ALT_ROOT_RT xe-10/2/0.200 flood 427

```

## show bridge flood brief

```

user@host> show bridge flood brief
Name Active CEs Active VEs
__juniper_private1__ 0 0
vs1::vlan100 6 0
vs1::vlan200 5 0

```

## show bridge flood detail

```

user@host> show bridge flood detail
Name: __juniper_private1__
CEs: 0
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex
 0x36/16 MLP_FLOOD __vs1+vlan100__ flood 426
 0x3a/16 MLP_FLOOD __vs1+vlan200__ flood 428
Name: vs1::vlan100
CEs: 6
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex

```

```

0x35/16 ALL_FLOOD __vs1+vlan100__ flood 425
0x35/16 RE_FLOOD __vs1+vlan100__ flood 425
0x3780/17 ALT_ROOT_RT ge-11/0/3.0 flood 425
0x3b80/17 ALT_ROOT_RT ge-11/1/4.100 flood 425
0x3c80/17 ALT_ROOT_RT ge-11/1/1.100 flood 425
0x3d80/17 ALT_ROOT_RT ge-11/1/0.100 flood 425
0x3e80/17 ALT_ROOT_RT xe-10/2/0.100 flood 425
0x3f80/17 ALT_ROOT_RT xe-10/0/0.100 flood 425
Name: vs1::vlan200
CEs: 5
VEs: 0
Flood Routes:
 Prefix Type Owner NhType NhIndex
 0x39/16 ALL_FLOOD __vs1+vlan200__ flood 427
 0x39/16 RE_FLOOD __vs1+vlan200__ flood 427
 0x4180/17 ALT_ROOT_RT ge-11/1/0.200 flood 427
 0x4080/17 ALT_ROOT_RT ge-11/1/1.200 flood 427
 0x4280/17 ALT_ROOT_RT ge-11/1/4.200 flood 427
 0x4480/17 ALT_ROOT_RT xe-10/0/0.200 flood 427
 0x4380/17 ALT_ROOT_RT xe-10/2/0.200 flood 427

```

### show bridge flood extensive

```

user@host> show bridge flood extensive
Name: __juniper_private1__
CEs: 0
VEs: 0
Flood route prefix: 0x36/16
Flood route type: MLP_FLOOD
Flood route owner: __vs1+vlan100__
Nexthop type: flood
Nexthop index: 426
 Interfaces Flooding to:
 Name Type NhType Index
 1c-11/0/0.32769 LC
 1c-10/2/0.32769 LC
 1c-10/0/0.32769 LC
 1c-11/1/0.32769 LC

Flood route prefix: 0x3a/16
Flood route type: MLP_FLOOD
Flood route owner: __vs1+vlan200__
Nexthop type: flood
Nexthop index: 428
 Interfaces Flooding to:
 Name Type NhType Index
 1c-10/0/0.32769 LC
 1c-10/2/0.32769 LC
 1c-11/1/0.32769 LC
Name: vs1::vlan100
CEs: 6
VEs: 0

Flood route prefix: 0x35/16
Flood route type: ALL_FLOOD
Flood route owner: __vs1+vlan100__
Nexthop type: flood
Nexthop index: 425
 Interfaces Flooding to:
 Name Type NhType Index
 ge-11/0/3.0 CE

```

```
ge-11/1/4.100 CE
ge-11/1/1.100 CE
ge-11/1/0.100 CE
xe-10/2/0.100 CE
xe-10/0/0.100 CE
```

```
Flood route prefix: 0x35/16
Flood route type: RE_FLOOD
Flood route owner: __vs1+vlan100__
Nexthop type: flood
Nexthop index: 425
```

```
 Interfaces Flooding to:
```

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

```
Flood route prefix: 0x3780/17
Flood route type: ALT_ROOT_RT
Flood route owner: ge-11/0/3.0
Nexthop type: flood
Nexthop index: 425
```

```
 Interfaces Flooding to:
```

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

```
Flood route prefix: 0x3b80/17
Flood route type: ALT_ROOT_RT
Flood route owner: ge-11/1/4.100
Nexthop type: flood
Nexthop index: 425
```

```
 Interfaces Flooding to:
```

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

```
Flood route prefix: 0x3c80/17
Flood route type: ALT_ROOT_RT
Flood route owner: ge-11/1/1.100
Nexthop type: flood
Nexthop index: 425
```

```
 Interfaces Flooding to:
```

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

Flood route prefix: 0x3d80/17  
 Flood route type: ALT\_ROOT\_RT  
 Flood route owner: ge-11/1/0.100  
 Nexthop type: flood  
 Nexthop index: 425

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

Flood route prefix: 0x3e80/17  
 Flood route type: ALT\_ROOT\_RT  
 Flood route owner: xe-10/2/0.100  
 Nexthop type: flood  
 Nexthop index: 425

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

Flood route prefix: 0x3f80/17  
 Flood route type: ALT\_ROOT\_RT  
 Flood route owner: xe-10/0/0.100  
 Nexthop type: flood  
 Nexthop index: 425

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/0/3.0   | CE   |        |       |
| ge-11/1/4.100 | CE   |        |       |
| ge-11/1/1.100 | CE   |        |       |
| ge-11/1/0.100 | CE   |        |       |
| xe-10/2/0.100 | CE   |        |       |
| xe-10/0/0.100 | CE   |        |       |

Name: vs1::vlan200

CEs: 5

VEs: 0

Flood route prefix: 0x39/16  
 Flood route type: ALL\_FLOOD  
 Flood route owner: \_\_vs1+vlan200\_\_  
 Nexthop type: flood  
 Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

Flood route prefix: 0x39/16  
 Flood route type: RE\_FLOOD

Flood route owner: \_\_vs1+vlan200\_\_

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

Flood route prefix: 0x4180/17

Flood route type: ALT\_ROOT\_RT

Flood route owner: ge-11/1/0.200

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

Flood route prefix: 0x4080/17

Flood route type: ALT\_ROOT\_RT

Flood route owner: ge-11/1/1.200

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

Flood route prefix: 0x4280/17

Flood route type: ALT\_ROOT\_RT

Flood route owner: ge-11/1/4.200

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

Flood route prefix: 0x4480/17

Flood route type: ALT\_ROOT\_RT

Flood route owner: xe-10/0/0.200

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |



xe-10/2/0.200 CE

Flood route prefix: 0x4380/17

Flood route type: ALT\_ROOT\_RT

Flood route owner: xe-10/2/0.200

Nexthop type: flood

Nexthop index: 427

Interfaces Flooding to:

| Name          | Type | NhType | Index |
|---------------|------|--------|-------|
| ge-11/1/0.200 | CE   |        |       |
| ge-11/1/1.200 | CE   |        |       |
| ge-11/1/4.200 | CE   |        |       |
| xe-10/0/0.200 | CE   |        |       |
| xe-10/2/0.200 | CE   |        |       |

## show bridge mac-table

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show bridge mac-table</b><br><b>&lt;brief   count   detail   extensive&gt;</b><br><b>&lt;bridge-domain (all   <i>bridge-domain-name</i>)&gt;</b><br><b>&lt;global-count&gt;</b><br><b>&lt;interface <i>interface-name</i>&gt;</b><br><b>&lt;mac-address&gt;</b><br><b>&lt;vlan-id (all-vlan   <i>vlan-id</i>)&gt;</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.<br>Command introduced in Junos OS Release 15.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | (MX Series routers only) Display Layer 2 media access control (MAC) address information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <b>none</b> —Display all learned Layer 2 MAC address information.<br><br><b>brief   count   detail   extensive</b> —(Optional) Display the specified level of output.<br><br><b>bridge-domain (all   <i>bridge-domain-name</i>)</b> —(Optional) Display learned Layer 2 MAC addresses for all bridging domains or for the specified bridging domain.<br><br><b>global-count</b> —(Optional) Display the total number of learned Layer 2 MAC addresses on the system.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display learned Layer 2 MAC addresses for the specified routing instance.<br><br><b>interface <i>interface-name</i></b> —(Optional) Display learned Layer 2 MAC addresses for the specified interface.<br><br><b>mac-address</b> —(Optional) Display the specified learned Layer 2 MAC address information.<br><br><b>vlan-id (all-vlan   <i>vlan-id</i>)</b> —(Optional) Display learned Layer 2 MAC addresses for all VLANs or for the specified VLAN. |
| <b>Additional Information</b>   | When Layer 2 protocol tunneling is enabled, the tunneling MAC address 01:00:0c:cd:cd:d0 is installed in the MAC table. When the Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunk Protocol (VTP) is configured for Layer 2 protocol tunneling on an interface, the corresponding protocol MAC address is installed in the MAC table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show bridge mac-table on page 2114</a><br><a href="#">show bridge mac-table (with Layer 2 Services over GRE Interfaces) on page 2114</a><br><a href="#">show bridge mac-table (with VXLAN Enabled) on page 2114</a><br><a href="#">show bridge mac-table count on page 2115</a><br><a href="#">show bridge mac-table detail on page 2115</a><br><a href="#">show bridge mac-table instance pbb-evpn on page 2116</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Output Fields** Table 216 on page 2113 describes the output fields for the **show bridge mac-table** command. Output fields are listed in the approximate order in which they appear.

**Table 216: show bridge mac-table Output Fields**

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Routing instance   | Name of the routing instance.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Bridging domain    | Name of the bridging domain.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MAC address        | MAC address or addresses learned on a logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| MAC flags          | Status of MAC address learning properties for each interface: <ul style="list-style-type: none"> <li>• <b>S</b>—Static MAC address is configured.</li> <li>• <b>D</b>—Dynamic MAC address is configured.</li> <li>• <b>L</b>—Locally learned MAC address is configured.</li> <li>• <b>C</b>—Control MAC address is configured.</li> <li>• <b>SE</b>—MAC accounting is enabled.</li> <li>• <b>NM</b>—Non-configured MAC.</li> <li>• <b>R</b>—Remote PE MAC address is configured.</li> </ul> |
| Logical interface  | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MAC count          | Number of MAC addresses learned on the specific routing instance or interface.                                                                                                                                                                                                                                                                                                                                                                                                              |
| Learning interface | Name of the logical interface on which the MAC address was learned.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Learning VLAN      | VLAN ID of the routing instance or bridge domain in which the MAC address was learned.                                                                                                                                                                                                                                                                                                                                                                                                      |
| VXLAN ID/VXLAN     | VXLAN Network Identifier (VNI).                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Layer 2 flags      | Debugging flags signifying that the MAC address is present in various lists.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Epoch              | Spanning Tree Protocol epoch number identifying when the MAC address was learned. Used for debugging.                                                                                                                                                                                                                                                                                                                                                                                       |
| Sequence number    | Sequence number assigned to this MAC address. Used for debugging.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Learning mask      | Mask of the Packet Forwarding Engines where this MAC address was learned. Used for debugging.                                                                                                                                                                                                                                                                                                                                                                                               |
| IPC generation     | Creation time of the logical interface when this MAC address was learned. Used for debugging.                                                                                                                                                                                                                                                                                                                                                                                               |

## Sample Output

### show bridge mac-table

```
user@host> show bridge mac-table
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned, C -Control MAC
 SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : default-switch
Bridging domain : test1, VLAN : 1

```

| MAC address       | MAC flags | Logical interface | NH Index | RTR ID |
|-------------------|-----------|-------------------|----------|--------|
| 01:00:0c:cc:cc:cc | S,NM      | NULL              |          |        |
| 01:00:0c:cc:cc:cd | S,NM      | NULL              |          |        |
| 01:00:0c:cd:cd:d0 | S,NM      | NULL              |          |        |
| 64:87:88:6a:17:d0 | D         | ae0.1             |          |        |
| 64:87:88:6a:17:f0 | D         | ae0.1             |          |        |

### show bridge mac-table (with Layer 2 Services over GRE Interfaces)

```
user@host> show bridge mac-table
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned
 SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : default-switch
Bridging domain : vlan-1, VLAN : 1

```

| MAC address       | MAC flags | Logical interface |
|-------------------|-----------|-------------------|
| 00:01:01:00:01:f7 | D,SE      | gr-1/2/10.0       |
| 00:03:00:32:01:f7 | D,SE      | gr-1/2/10.0       |
| 00:00:21:11:11:10 | DL        | ge-1/0/0.0        |
| 00:00:21:11:11:11 | DL        | ge-1/1/0.0        |

```
Routing instance : default-switch
Bridging domain : vlan-2, VLAN : 2

```

| MAC address       | MAC flags | Logical interface |
|-------------------|-----------|-------------------|
| 00:02:01:33:01:f7 | D,SE      | gr-1/2/10.1       |
| 00:00:21:11:21:10 | DL        | ge-1/0/0.1        |
| 00:00:21:11:21:11 | DL        | ge-1/1/0.1        |

### show bridge mac-table (with VXLAN Enabled)

```
user@host> show bridge mac-table
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned
 SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : default-switch
Bridging domain : vlan-1, VLAN : 1
VXLAN: Id : 100, Multicast group: 226.1.1.1

```

| MAC address       | MAC flags | Logical interface |
|-------------------|-----------|-------------------|
| 00:01:01:00:01:f7 | D,SE      | vtep.1052010      |
| 00:03:00:32:01:f7 | D,SE      | vtep.1052011      |
| 00:00:21:11:11:10 | DL        | ge-1/0/0.0        |
| 00:00:21:11:11:11 | DL        | ge-1/1/0.0        |

```

Routing instance : default-switch
Bridging domain : vlan-2, VLAN : 2, VXLAN : 200
VXLAN: Id : 200, Multicast group: 226.1.1.2
MAC MAC Logical
address flags interface
00:02:01:33:01:f7 D,SE vtep.1052010
00:04:00:14:01:f7 D,SE vtep.1052011
00:00:21:11:21:10 DL ge-1/0/0.1
00:00:21:11:21:11 DL ge-1/1/0.1

```

### show bridge mac-table count

```

user@host> show bridge mac-table count
2 MAC address learned in routing instance vs1 bridge domain vlan100

```

MAC address count per interface within routing instance:

| Logical interface | MAC count |
|-------------------|-----------|
| ge-11/0/3.0       | 1         |
| ge-11/1/4.100     | 0         |
| ge-11/1/1.100     | 0         |
| ge-11/1/0.100     | 0         |
| xe-10/2/0.100     | 1         |
| xe-10/0/0.100     | 0         |

MAC address count per learn VLAN within routing instance:

| Learn VLAN ID | MAC count |
|---------------|-----------|
| 0             | 2         |

```

0 MAC address learned in routing instance vs1 bridge domain vlan200

```

MAC address count per interface within routing instance:

| Logical interface | MAC count |
|-------------------|-----------|
| ge-11/1/0.200     | 0         |
| ge-11/1/1.200     | 0         |
| ge-11/1/4.200     | 0         |
| xe-10/0/0.200     | 0         |
| xe-10/2/0.200     | 0         |

MAC address count per learn VLAN within routing instance:

| Learn VLAN ID | MAC count |
|---------------|-----------|
| 0             | 0         |

### show bridge mac-table detail

```

user@host> show bridge mac-table detail
MAC address: 00:00:00:19:1c:db
Routing instance: vs1
Bridging domain: vlan100
Learning interface: ge-11/0/3.0 Learning VLAN: 0
Layer 2 flags: in_ifd, in_ifl, in_vlan, kernel
Epoch: 4 Sequence number: 0
Learning mask: 0x800 IPC generation: 0

MAC address: 00:00:00:59:3a:2f
Routing instance: vs1
Bridging domain: vlan100
Learning interface: xe-10/2/0.100 Learning VLAN: 0
Layer 2 flags: in_ifd, in_ifl, in_vlan, kernel
Epoch: 7 Sequence number: 0
Learning mask: 0x400 IPC generation: 0

```

**show bridge mac-table instance pbb-evpn**

```
user@host> show bridge mac-table instance pbb-evpn
Routing instance : pbb-evpn
Bridging domain : isid-bd10000, ISID : 10000
MAC MAC Logical NH RTR
address flags interface Index ID
00:19:e2:b0:76:eb D cbp.1000
aa:bb:cc:dd:ee:f2 DC
aa:bb:cc:dd:ee:f3 DC 1048576 1048576
 1048575 1048575
```

## show bridge statistics

|                                 |                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show bridge statistics</b><br><b>&lt;bridge-domain <i>domain-name</i>&gt;</b><br><b>&lt;instance <i>instance-name</i>&gt;</b>                                                                                                                                                                                      |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | (MX Series routers only) Display bridge statistics.                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <b>none</b> —Display bridge statistics for all bridge domains in all routing instances.<br><br><b>bridge-domain <i>domain-name</i></b> —(Optional) Display statistics for the specified bridge domain.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display statistics for the specified routing instance. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show bridge statistics on page 2117</a>                                                                                                                                                                                                                                                                   |

## Sample Output

### show bridge statistics

```

user@host> show bridge statistics
Information for routing instance:

Routing instance : __juniper_private1__
 Index: 1 Sequence number: 0
 MAC limit: 5000 MACs learned: 0
 Static MACs learned: 0 Non config Static MACs learned: 0
 Handle: 0x829e800

Information for routing instance:

Routing instance : vs1
 Bridging domain : vlan100
 Index: 3 Sequence number: 0
 MAC limit: 5120 MACs learned: 2
 Static MACs learned: 0 Non config Static MACs learned: 0
 Handle: 0x829e400
 Flags: Bridge instance, Config defined, VLAN : 100
 Local interface: ge-11/0/3.0, Index: 79
 Broadcast packets: 1
 Broadcast bytes : 65
 Multicast packets: 0
 Multicast bytes : 0
 Flooded packets : 0
 Flooded bytes : 0
 Unicast packets : 358624489
 Unicast bytes : 23310592305
 Current MAC count: 1 (Limit 1024)
 Local interface: ge-11/1/4.100, Index: 84
 Broadcast packets: 0
 Broadcast bytes : 0
 Multicast packets: 0
 Multicast bytes : 0

```

```

Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: ge-11/1/1.100, Index: 86
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: ge-11/1/0.100, Index: 87
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: xe-10/2/0.100, Index: 88
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 358627393
Unicast bytes : 23310781065
Current MAC count: 1 (Limit 1024)
Local interface: xe-10/0/0.100, Index: 89
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)

```

#### Information for routing instance:

```

Routing instance : vs1
Bridging domain : vlan200
Index: 4 Sequence number: 0
MAC limit: 5120 MACs learned: 0
Static MACs learned: 0 Non config Static MACs learned: 0
Handle: 0x829e600
Flags: Bridge instance, Config defined, VLAN : 200
Local interface: ge-11/1/0.200, Index: 90
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0

```



```
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: ge-11/1/1.200, Index: 91
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: ge-11/1/4.200, Index: 92
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: xe-10/0/0.200, Index: 93
Broadcast packets: 0
Broadcast bytes : 0
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
Local interface: xe-10/2/0.200, Index: 94
Broadcast packets: 4
Broadcast bytes : 260
Multicast packets: 0
Multicast bytes : 0
Flooded packets : 0
Flooded bytes : 0
Unicast packets : 0
Unicast bytes : 0
Current MAC count: 0 (Limit 1024)
```

## show l2-learning global-information

|                                 |                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show l2-learning global-information</b>                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                            |
| <b>Description</b>              | (MX Series routers only) Display Layer 2 learning process-related information for the entire router.                                                                                                   |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                           |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show l2-learning global-information on page 2120</a>                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 217 on page 2120</a> describes the output fields for the <b>show l2-learning global-information</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 217: show l2-learning global-information Output Fields**

| Field Name                    | Field Description                                                                                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MAC aging interval</b>     | Configured timeout interval, in seconds, for all MAC table entries.                                                                                                                |
| <b>MAC learning</b>           | Status of MAC learning: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                        |
| <b>MAC statistics</b>         | Status of MAC accounting: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                      |
| <b>MAC limit Count</b>        | Configured maximum limit on the number of MAC addresses that can be learned.                                                                                                       |
| <b>MAC limit hit flag</b>     | Status of the learned MAC limit hit flag: <b>Enabled</b> (the learned MAC exceeds the global MAC limit) or <b>Disabled</b> (the learned MAC does not exceed the global MAC limit). |
| <b>MAC packet action drop</b> | Status of action to drop packets after the configured MAC address limit is reached: <b>Enabled</b> (packets are dropped) or <b>Disabled</b> (packets are forwarded).               |

## Sample Output

### show l2-learning global-information

```

user@host> show l2-learning global-information
Global Configuration:

MAC aging interval : 300
MAC learning : Enabled
MAC statistics : Disabled
MAC limit Count : 393215
MAC limit hit flag : Disabled
MAC packet action drop : Disabled

```



## show l2-learning global-mac-count

---

|                                 |                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show l2-learning global-mac-count</code>                                                                       |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.3.                                                                          |
| <b>Description</b>              | (MX Series routers only) Display the total number of dynamic and static MAC addresses learned for the entire router. |
| <b>Options</b>                  | This command has no options.                                                                                         |
| <b>Required Privilege Level</b> | view                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show l2-learning global-mac-count on page 2122</a>                                                       |
| <b>Output Fields</b>            | Displays the total number of dynamic and static MAC addresses learned for the entire router.                         |

### Sample Output

#### show l2-learning global-mac-count

```
user@host> show l2-learning global-mac-count
100 dynamic and static MAC addresses learned globally
```

## show l2-learning instance

|                                 |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show l2-learning instance</b>                                                                                                                                                             |
| <b>Release Information</b>      | (MX Series routers only) Command introduced in Junos OS Release 8.4.                                                                                                                         |
| <b>Description</b>              | Display Layer 2 learning properties for all the configured routing instances.                                                                                                                |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                 |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show l2-learning instance on page 2123</a>                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 218 on page 2123</a> describes the output fields for the <b>show l2-learning instance</b> command. Output fields are listed in the approximate order in which they appear. |

Table 218: show l2-learning instance Output Fields

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Routing Instance</b>       | Name of routing instance.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Bridging Domain</b>        | Name of bridging domain.<br><br>On MX Series routers you can use the <b>show l2-learning instance &lt;extensive&gt;</b> command option to display the Bridge Service-id information which includes the Config Service ID and the Active Service ID.                                                                                                                                                                                                              |
| <b>Index</b>                  | Number associated with the routing instance or bridging domain.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Logical System</b>         | Name of logical system or <b>Default</b> if no logical system is configured.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Routing instance flags</b> | Status of Layer 2 learning properties for each routing instance: <ul style="list-style-type: none"> <li>• <b>DL</b>—MAC learning is disabled.</li> <li>• <b>SE</b>—MAC accounting is enabled.</li> <li>• <b>AD</b>—Packets are dropped after MAC address limit is reached.</li> <li>• <b>LH</b>—The maximum number of MAC addresses has been learned on the routing instance. The routing instance is not able to learn any additional MAC addresses.</li> </ul> |
| <b>MAC limit</b>              | Maximum number of MAC addresses that can be learned from each interface in the routing instance or bridging domain.                                                                                                                                                                                                                                                                                                                                              |

## Sample Output

### show l2-learning instance

```
user@host> show l2-learning instance
Information for routing instance:

Routing Instance flags (DL -disable learning, SE -stats enabled,
```

AD -packet action drop, LH -mac limit hit)

| Routing<br>Instance  | Bridging<br>Domain | Index | Logical<br>System | Routing<br>flags | MAC<br>limit |
|----------------------|--------------------|-------|-------------------|------------------|--------------|
| __juniper_private1__ |                    | 1     | Default           |                  | 5000         |
| vs1                  | vlan100            | 3     | Default           |                  | 5120         |
| vs1                  | vlan200            | 4     | Default           |                  | 5120         |

## show l2-learning interface

|                                 |                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show l2-learning interface</b>                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                   |
| <b>Description</b>              | (MX Series routers only) Display Layer 2 learning information for all the interfaces.                                                                                                         |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show l2-learning interface on page 2125</a>                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 219 on page 2125</a> describes the output fields for the <b>show l2-learning interface</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 219: show l2-learning interface Output Fields**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Logical interface</b>       | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                           |
| <b>Index</b>                   | Index of the interface.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Routing Instance</b>        | Number of the routing instance to which the interface belongs.                                                                                                                                                                                                                                                                                                                           |
| <b>Interface device</b>        | Value of the order in which the Junos OS finds and initializes the interface.                                                                                                                                                                                                                                                                                                            |
| <b>Logical interface flags</b> | Status of Layer 2 learning properties for each interface: <ul style="list-style-type: none"> <li>• <b>DL</b>—MAC learning is disabled.</li> <li>• <b>SE</b>—MAC accounting is enabled.</li> <li>• <b>AD</b>—Packets are dropped after the MAC interface limit is reached.</li> <li>• <b>MAC limit</b>—Maximum number of MAC addresses that can be learned from the interface.</li> </ul> |

## Sample Output

### show l2-learning interface

```
user@host> show l2-learning interface
Information for interface family:
```

```
Logical Interface flags (DL -disable learning, SE -stats enabled,
AD -packet action drop, LH -mac limit hit)
```

| Logical interface | Index | Routing instance | Interface device | Logical Interface flags | MAC limit |
|-------------------|-------|------------------|------------------|-------------------------|-----------|
| ge-11/0/3.0       | 79    | 3                | 136              |                         | 1024      |
| ge-11/1/4.100     | 84    | 3                | 150              |                         | 1024      |
| ge-11/1/1.100     | 86    | 3                | 147              |                         | 1024      |

|               |    |   |     |      |
|---------------|----|---|-----|------|
| ge-11/1/0.100 | 87 | 3 | 146 | 1024 |
| xe-10/2/0.100 | 88 | 3 | 144 | 1024 |
| xe-10/0/0.100 | 89 | 3 | 129 | 1024 |
| ge-11/1/0.200 | 90 | 4 | 146 | 1024 |
| ge-11/1/1.200 | 91 | 4 | 147 | 1024 |
| ge-11/1/4.200 | 92 | 4 | 150 | 1024 |
| xe-10/0/0.200 | 93 | 4 | 129 | 1024 |
| xe-10/2/0.200 | 94 | 4 | 144 | 1024 |



## show mac-rewrite interface

|                                 |                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show mac-rewrite interface</b><br><b>&lt;brief   detail&gt;</b><br><b>&lt;interface-name&gt;</b>                                                                                                            |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.1.<br>Command introduced in Junos OS Release 14.1X53-D10 for EX Series switches.                                                                                      |
| <b>Description</b>              | Display Layer 2 protocol tunneling information.                                                                                                                                                                |
| <b>Options</b>                  | <b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>interface <i>interface-name</i></b> —(Optional) Display Layer 2 protocol tunneling information for the specified interface. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>layer2-control</i></li> <li><i>mac-rewrite</i></li> </ul>                                                                                                            |
| <b>List of Sample Output</b>    | <a href="#">show mac-rewrite interface on page 2127</a><br><a href="#">show mac-rewrite interface (EX Series Switch) on page 2128</a>                                                                          |
| <b>Output Fields</b>            | Table 220 on page 2127 lists the output fields for the <b>show mac-rewrite interface</b> command. Output fields are listed in the approximate order in which they appear.                                      |

**Table 220: show mac-rewrite interface Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                                       | Level of Output     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Interface</b> | Name of the interface that has Layer 2 protocol tunneling configured on it.                                                                                                                                                                                                                                             | <b>brief detail</b> |
| <b>Protocols</b> | Layer 2 protocols being tunneled on this interface: Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), Per-VLAN Spanning Tree Plus (PVSTP+), or VLAN Trunk Protocol (VTP).<br><br>On EX Series switches, the following Layer 2 protocols are supported: 802.3A, CDP, LACP, LLDP, MVRP, STP, VTP, GVRP, VSTP. | <b>brief detail</b> |

## Sample Output

### show mac-rewrite interface

```

user@host> show mac-rewrite interface
Interface Protocols

ge-1/0/5 STP VTP CDP PVSTP+

```

### show mac-rewrite interface (EX Series Switch)

```
user@switch> show mac-rewrite interface
Interface Protocols
ge-0/0/1 STP
```

## CHAPTER 30

# VPN Operational Commands

- `clear vpls mac-address`
- `clear vpls mac-table`
- `request l2circuit-switchover`
- `show dynamic-tunnels database`
- `show hfrr profiles`
- `show ingress-replication mvpn`
- `show l2circuit connections`
- `show l2vpn connections`
- `show mvpn c-multicast`
- `show mvpn instance`
- `show mvpn neighbor`
- `show vpls connections`
- `show vpls flood event-queue`
- `show vpls flood instance`
- `show vpls flood route`
- `show vpls mac-table`
- `show vpls statistics`

## clear vpls mac-address

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear vpls mac-address</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;mac-address&gt;</code>                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | (T Series and M Series routers, except for the M160 router) Clear media access control (MAC) address entries from the virtual private LAN service (VPLS) table.                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b>none</b> —Clear all MAC address entries from the VPLS table for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear all MAC address entries for a VPLS instance from the VPLS table.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>mac-address</b> —(Optional) Clear a specific MAC address in a VPLS instance from the VPLS table. |
| <b>Required Privilege Level</b> | maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">clear vpls mac-address on page 2130</a>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### clear vpls mac-address

```
user@host> clear vpls mac-address
```

## clear vpls mac-table

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear vpls mac-table<br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><mac-address><br><vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 9.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | (MX Series routers) Clear media access control (MAC) addresses from the virtual private LAN service (VPLS) MAC table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>none</b>—Clear all MAC addresses from the VPLS table for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear all MAC addresses for a VPLS instance from the VPLS table.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear all MAC addresses for a VPLS interface from the VPLS table.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>mac-address</b>—(Optional) Clear a specific MAC address in a VPLS instance from the VPLS table.</p> <p><b>vlan-id</b>—(Optional) Clear MAC addresses on a specified VLAN (0 through 4095).</p> |
| <b>Required Privilege Level</b> | maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">clear vpls mac-table on page 2131</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Sample Output

### clear vpls mac-table

```
user@host> clear vpls mac-table
```

## request l2circuit-switchover

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>request l2circuit-switchover</code><br><code>&lt;logical-system (all   logical-system-name)&gt;</code><br><code>&lt;neighbor address&gt;</code><br><code>&lt;virtual-circuit-id identifier&gt;</code>                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 14.1X53-D10 for the QFX Series and for EX4600 switches.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Manually trigger a switch from the active pseudowire to the redundant pseudowire. This command can be useful when performing network maintenance.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>neighbor address</b> —(Optional) Trigger a switch of all of the active pseudowire connections with the specified neighbor to their respective redundant pseudowires.<br><br><b>virtual-circuit-id <i>identifier</i></b> —(Optional) Trigger a switch from the active pseudowire connection of the specified Layer 2 circuit to its redundant pseudowire. |
| <b>Required Privilege Level</b> | maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>MPLS Feature Support on QFX Series and EX4600 Switches</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">request l2circuit-switchover virtual-circuit-id on page 2132</a>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Sample Output

### request l2circuit-switchover virtual-circuit-id

```
user@host>request l2circuit-switchover virtual-circuit-id 12
```

## show dynamic-tunnels database

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show dynamic-tunnels database<br><destination><br><logical-system (all   <i>logical-system-name</i> )><br><table <i>routing-table-name</i> >                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display dynamic tunnel database information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>none</b>—Display dynamic tunnel database information for all destinations and routing tables.</p> <p><b>destination</b>—(Optional) Display database entries for the specified IP address (with optional destination prefix length) only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>table <i>routing-table-name</i></b>—(Optional) Display database entries for the specified table only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>    | <a href="#">show dynamic-tunnels database (Tunnel Is Up) on page 2134</a><br><a href="#">show dynamic-tunnels database (No Tunnel PIC) on page 2134</a><br><a href="#">show dynamic-tunnels database (Tunnel Is Expiring) on page 2134</a><br><a href="#">show dynamic-tunnels database (Destination Specified) on page 2134</a>                                                                                                                                                                                               |
| <b>Output Fields</b>            | Table 221 on page 2133 lists the output fields for the <b>show dynamic-tunnels database</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                   |

**Table 221: show dynamic-tunnels database Output Fields**

| Field Name                 | Field Description                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Table</b>               | Name of the routing table (for example, <b>inet.0</b> ).                                              |
| <b>Destination-network</b> | Destination IP address and subnet.                                                                    |
| <b>Tunnel to</b>           | Destination IP address and prefix of the tunnel.                                                      |
| <b>State</b>               | State of the tunnel: <b>Up</b> , <b>Up (expires in <i>nn:nn:nn</i>seconds)</b> , or <b>Dn</b> (down). |
| <b>Reference count</b>     | Number of routes across the dynamic tunnel that are currently being resolved.                         |
| <b>Next-hop type</b>       | Type of tunnel: GRE.                                                                                  |
| <b>Source address</b>      | Source IP address of the tunnel.                                                                      |

Table 221: show dynamic-tunnels database Output Fields (*continued*)

| Field Name      | Field Description                                                  |
|-----------------|--------------------------------------------------------------------|
| <b>Next-hop</b> | IP address of the destination interface.                           |
| <b>State</b>    | State of the destination interface: Up, Dn, or Dn (no tunnel pic). |

## Sample Output

### show dynamic-tunnels database (Tunnel Is Up)

```

user@host> show dynamic-tunnels database
Table: inet.3

Destination-network: 10.255.120.94/32
Tunnel to: 10.255.120.94/32 State: Up
Reference count: 2
Next-hop type: gre
Source address: 10.255.120.92
Next hop: gr-4/3/0.32769
State: Up

```

### show dynamic-tunnels database (No Tunnel PIC)

```

user@host> show dynamic-tunnels database
Table: inet.3

Destination-network: 10.255.120.94/32
Tunnel to: 10.255.120.94/32 State: Dn
Reference count: 2
Next-hop type: gre
Source address: 10.255.120.92
State: Dn (no tunnel pic)

```

### show dynamic-tunnels database (Tunnel Is Expiring)

```

user@host> show dynamic-tunnels database
Table: inet.3

Destination-network: 10.255.120.94/32
Tunnel to: 10.255.120.94/32 State: Up (expires in 00:14:56 seconds)
Reference count: 0
Next-hop type: gre
Source address: 10.255.120.92
Next hop: gr-4/3/0.32769
State: Up

```

### show dynamic-tunnels database (Destination Specified)

```

user@host> show dynamic-tunnels database 10.255.120.94
Table: inet.3

Destination-network: 10.255.120.94/32
Tunnel to: 10.255.120.94/32 State: Up
Reference count: 2
Next-hop type: gre
Source address: 10.255.120.92

```



Next hop: gr-4/3/0.32769  
State: Up

## show hfrr profiles

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show hfrr profiles<br><brief  extensive>                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | <p>Display host fast reroute (HFRR) profile information.</p> <p>HFRR adds a precomputed protection path into the Packet Forwarding Engine, such that if a link between a provider edge device and a server farm becomes unusable for forwarding, the Packet Forwarding Engine can use another path without having to wait for the router or the protocols to provide updated forwarding information.</p> |
| <b>Options</b>                  | <p><b>none</b>—Display information about HRFF profiles.</p> <p><b>brief   extensive</b>—(Optional) Display the specified level of output.</p>                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Link Protection with Host Fast Reroute</i></li> </ul>                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show hfrr profiles on page 2137</a>                                                                                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>            | <p><a href="#">Table 222 on page 2136</a> describes the output fields for the <b>show hfrr profiles</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                             |

Table 222: show hfrr profiles Output Fields

| Field Name                                        | Field Description                                                                                                                            |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| HFRR pointer                                      |                                                                                                                                              |
| HFRR current state                                | Status of the HFRR profile: <b>HFRR_ACTIVE</b> , <b>HFRR_INACTIVE</b> , <b>HFRR_IFLH-NOT-CONF</b> , and so on.                               |
| HFRR Prefix limit blackout timer expiry (in secs) | Time interval between an HFRR profile becoming inactive on exceeding the ARP prefix limit, and the profile starting the <b>SYNC</b> process. |
| HFRR prefix limit hit count                       | Number of times that an HFRR profile becomes inactive on exceeding the ARP prefix limit.                                                     |
| HFRR protected IFL name                           | Interface configured for the HFRR feature.                                                                                                   |
| HFRR protected IFL handle                         |                                                                                                                                              |
| HFRR routing instance name                        | The routing instance in which the HFRR interface is configured.                                                                              |
| HFRR routing instance handle                      |                                                                                                                                              |

Table 222: show hfrf profiles Output Fields (*continued*)

| Field Name                                        | Field Description                                                                                 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------|
| HFRR sync BG scheduled                            |                                                                                                   |
| HFRR RTS filter on                                |                                                                                                   |
| HFRR delete BG scheduled                          |                                                                                                   |
| HFRR ARP prefix limit                             | Configured ARP prefix limit.                                                                      |
| HFRR ARP supplementary blackout timeout (in mins) | Supplementary time-out value configured for profile to be inactive when it hits ARP prefix limit. |
| HFRR number of ARP routes learned                 | Number of ARP routes learned on the configured interface.                                         |
| HFRR number of FRR routes created                 | Number of ARP routes created on the configured interface.                                         |

## Sample Output

### show hfrf profiles

```

user@host> show hfrf profiles
HFRR pointer: 0x9254000
HFRR current state: HFRR_ACTIVE
HFRR Prefix limit blackout timer expiry (in secs): 0
HFRR prefix limit hit count: 0
HFRR protected IFL name: ge-4/1/0.0
HFRR protected IFL handle: 0x9248738
HFRR routing instance name: test
HFRR routing instance handle: 0x9145740
HFRR sync BG scheduled: NO
HFRR RTS filter on: YES
HFRR delete BG scheduled: NO
HFRR ARP prefix limit: 0
HFRR ARP supplementary blackout timeout (in mins): 1
HFRR number of ARP routes learned: 4
HFRR number of FRR routes created: 2

```

## show ingress-replication mvpn

|                                 |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ingress-replication mvpn                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.4.                                                                                                                                                 |
| <b>Description</b>              | Display the state and configuration of the ingress replication tunnels created for the MVPN application when using the <b>mpls-internet-multicast</b> routing instance type.                 |
| <b>Required Privilege Level</b> | View                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show ingress-replication mvpn on page 2138</a>                                                                                                                                   |
| <b>Output Fields</b>            | <a href="#">Table 223 on page 2138</a> lists the output fields for the <b>show ingress-replication mvpn</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 223: show ingress-replication mvpn Output Fields**

| Field Name             | Field Description                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Ingress tunnel</b>  | Identifies the MVPN ingress replication tunnel.                                                                          |
| <b>Application</b>     | Identifies the application (MVPN).                                                                                       |
| <b>Unicast tunnels</b> | List of unicast tunnels in use.                                                                                          |
| <b>Leaf address</b>    | Address of the tunnel.                                                                                                   |
| <b>Tunnel type</b>     | Identifies the unicast tunnel type.                                                                                      |
| <b>Mode</b>            | Indicates whether the tunnel was created as a new tunnel for the ingress replication, or if an existing tunnel was used. |
| <b>State</b>           | Indicates whether the tunnel is Up or Down.                                                                              |

## Sample Output

### show ingress-replication mvpn

```

user@host> show ingress-replication mvpn
Ingress Tunnel: mvpn:1
 Application: MVPN
 Unicast tunnels
 Leaf Address Tunnel-type Mode State
 10.255.245.2 P2P LSP New Up
 10.255.245.4 P2P LSP New Up
Ingress Tunnel: mvpn:2
 Application: MVPN
 Unicast tunnels
 Leaf Address Tunnel-type Mode State
 10.255.245.2 P2P LSP Existing Up

```



## show l2circuit connections

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show l2circuit connections</code><br><code>&lt;brief   extensive   summary&gt;</code><br><code>&lt;down   up   up-down&gt;</code><br><code>&lt;history&gt;</code><br><code>&lt;interface <i>interface-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;neighbor <i>neighbor</i>&gt;</code><br><code>&lt;status&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Display enhancements in Junos OS Release 9.6.<br>Display enhancements in Junos OS Release 10.2.<br>Display enhancements in Junos OS Release 12.1.<br>Display enhancements in Junos OS Release 13.2.<br>Statement introduced in Junos OS Release 14.1X53-D10 for the QFX Series and for EX4600 switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display status information about Layer 2 virtual circuits from the local provider edge (PE) router to its neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>none</b>—Display standard information about Layer 2 virtual circuits on all interfaces for all neighbors.</p> <p><b>brief   extensive   summary</b>—(Optional) Display the specified level of output. Use history to display information about connection history. Use status to display information about the connection and interface status.</p> <p><b>down   up   up-down</b>—(Optional) Display nonoperational, operational, or both kinds of connections.</p> <p><b>history</b>—(Optional) Display information about connection history.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Show all Layer 2 virtual circuits on an interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor <i>neighbor</i></b>—(Optional) IP address of a specific neighbor.</p> <p><b>status</b>—(Optional) Display information about the connection and interface status.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <a href="#">show l2circuit connections on page 2144</a><br><a href="#">show l2circuit connections interface on page 2145</a><br><a href="#">show l2circuit connections extensive on page 2145</a><br><a href="#">show l2circuit connections extensive (Pseudowire Redundancy with Hot Standby) on page 2146</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Output Fields** Table 224 on page 2141 lists the output fields for the **show l2circuit connections** command. Output fields are listed in the approximate order in which they appear.

**Table 224: show l2circuit connections Output Fields**

| Field Name                         | Field Description                                                      |
|------------------------------------|------------------------------------------------------------------------|
| <b>Layer-2 Circuit Connections</b> | Displays the legends for connection and interface status.              |
| <b>Neighbor</b>                    | Remote PE neighbor.                                                    |
| <b>Interface</b>                   | Logical PE-to-CE interface on which the virtual circuit is configured. |
| <b>Type</b>                        | VC type: <b>rmt</b> (remote) or <b>loc</b> (local).                    |

Table 224: show l2circuit connections Output Fields (*continued*)

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Legend for connection status (St)</b> | <p>Status of the virtual circuit connection:</p> <ul style="list-style-type: none"> <li>• <b>EI</b>—The local virtual circuit interface is configured with an encapsulation that is not supported.</li> <li>• <b>MM</b>—The two routers do not agree on an MTU value, which causes an MTU mismatch.</li> <li>• <b>EM</b>—The encapsulation type received on this virtual circuit from the neighbor does not match the local virtual circuit interface encapsulation type.</li> <li>• <b>CM</b>—The two routers do not agree on a control word, which causes a control word mismatch.</li> <li>• <b>VM</b>—The remote and local VLAN IDs do not match across the Layer 2 circuit.</li> <li>• <b>OL</b>—No advertisement has been received for this virtual circuit from the neighbor. There is no outgoing label available for use by this virtual circuit.</li> <li>• <b>NC</b>—The interface is not configured as a CCC or TCC interface.</li> <li>• <b>BK</b>—The virtual circuit has switched to a backup connection.</li> <li>• <b>CB</b>—The remote PE router is advertising a different cell bundle from that configured on the local PE router.</li> <li>• <b>LD</b>—The connection to the local site is signaled down, because the CE-facing interface to the local site is down.</li> <li>• <b>RD</b>—The remote neighbor is down. It has signaled a problem using the pseudowire status code.</li> <li>• <b>NP</b>—The router detects that interface hardware is not present. The hardware may be offline, a PIC may not be of the desired type, or the interface may be configured in a different routing instance.</li> <li>• <b>Dn</b>—The virtual circuit is down.</li> <li>• <b>VC-Dn</b>—The virtual circuit is down because there is no tunnel LSP from the local PE router to the neighbor.</li> <li>• <b>UP</b>—The virtual circuit is operational.</li> <li>• <b>CF</b>—The router cannot find enough bandwidth to the remote router to satisfy the Layer 2 circuit bandwidth requirement.</li> <li>• <b>IB</b>—The bit rate is incompatible for Time Division Multiplexing (TDM).</li> <li>• <b>TDM</b>—TDM is not configured correctly.</li> <li>• <b>ST</b>—The virtual circuit has been switched to a standby connection.</li> <li>• <b>SP</b>—The virtual circuit connection is using a static pseudowire.</li> <li>• <b>RS</b>—The remote site is in a standby state.</li> <li>• <b>XX</b>—The virtual circuit is down for an unknown reason. This is a programming error.</li> </ul> |
| <b>Time last up</b>                      | Date and time the virtual circuit was last operational.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b># Up trans</b>                        | Number of times the virtual circuit came up.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>local-interface-name</b>              | Name of the local PE-to-CE interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Status</b>                            | Status of the local interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Up</b>                                | Interface is operational.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 224: show l2circuit connections Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dn</b>                       | Interface is not operational.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>NP</b>                       | Not present. Interface does not exist.                                                                                                                                                                                                                                                                                                                                                                              |
| <b>DS</b>                       | Disabled. Interface has been administratively disabled.                                                                                                                                                                                                                                                                                                                                                             |
| <b>WE</b>                       | Wrong encapsulation. The interface is not configured as CCC.                                                                                                                                                                                                                                                                                                                                                        |
| <b>UN</b>                       | Interface status is initialized.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Encapsulation</b>            | Encapsulation of the local interface.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Remote PE</b>                | Prefix of the remote PE router.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Negotiated control-word</b>  | Whether the use of the control word has been negotiated for this virtual circuit: <b>Yes (Null)</b> or <b>No</b> .                                                                                                                                                                                                                                                                                                  |
| <b>Incoming label</b>           | Label used by the remote side of the virtual circuit to send packets destined to the local side. This label is routed to the local virtual circuit interface.                                                                                                                                                                                                                                                       |
| <b>Outgoing label</b>           | Label used by the local side of the virtual circuit to send packets to the remote side of the virtual circuit. Packets originated on the local virtual circuit interface are encapsulated with this label before being placed on the tunnel LSP to the neighbor for this virtual circuit. This label is allocated by the neighbor and is used in demultiplexing incoming packets destined for this virtual circuit. |
| <b>Negotiated PW status TLV</b> | Displays the pseudowire status type, length, and value (TLV). TLVs are a method of encoding variable-length or optional information. If the pseudowire status TLV is used, the corresponding local or neighbor PE router status code is also displayed.                                                                                                                                                             |
| <b>local PW status code</b>     | If the pseudowire status TLV is used, displays the local PE router status code.                                                                                                                                                                                                                                                                                                                                     |
| <b>Neighbor PW status code</b>  | If the pseudowire status TLV is used, displays the neighbor PE router status code.                                                                                                                                                                                                                                                                                                                                  |
| <b>Local interface</b>          | Name of the local interface used for the Layer 2 circuit connection.                                                                                                                                                                                                                                                                                                                                                |
| <b>Status</b>                   | Status of the local interface ( <b>Up</b> or <b>Down</b> ).                                                                                                                                                                                                                                                                                                                                                         |
| <b>Encapsulation</b>            | Encapsulation configured for the local interface.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>APS-active</b>               | Indicates that the interface belongs to the working circuit.                                                                                                                                                                                                                                                                                                                                                        |
| <b>APS-inactive</b>             | Indicates that the interface belongs to the protect circuit.                                                                                                                                                                                                                                                                                                                                                        |
| <b>Connection protection</b>    | Whether or not connection protection is configured for the Layer 2 circuit to the neighbor: <b>Yes</b> or <b>No</b> .                                                                                                                                                                                                                                                                                               |

Table 224: show l2circuit connections Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VC bandwidth       | Bandwidth requirement of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Time               | Time at which the event occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Connection History | <p>Event types logged in history.</p> <ul style="list-style-type: none"> <li>• <b>loc intf up</b>—Local virtual circuit interface went up.</li> <li>• <b>loc intf down</b>—Local virtual circuit interface went down.</li> <li>• <b>In lbl Update</b>—Incoming label has been updated.</li> <li>• <b>Out lbl Update</b>—Outgoing label has been updated.</li> <li>• <b>PE route changed</b>—Route to PE router has been updated.</li> <li>• <b>PE route down</b>—Route to PE router is down.</li> <li>• <b>rmt side marked</b>—Remote side is marked.</li> <li>• <b>VC Dn</b>—Remote side indicated that its end of the virtual circuit is down (if the tunnel LSP from the remote side to the local side is down).</li> <li>• <b>status update timer</b>—Status update timer processing. It computes the state of the virtual circuit, and determines whether it should be advertised to or withdrawn from the remote side.</li> </ul> |

## Sample Output

### show l2circuit connections

```
user@host> show l2circuit connections
```

```
Layer-2 Circuit Connections:
```

```
Legend for connection status (St)
```

```

EI -- encapsulation invalid NP -- interface h/w not present
MM -- mtu mismatch Dn -- down
EM -- encapsulation mismatch VC-Dn -- Virtual circuit Down
CM -- control-word mismatch Up -- operational
VM -- vlan id mismatch CF -- Call admission control failure
OL -- no outgoing label IB -- TDM incompatible bitrate
NC -- intf encaps not CCC/TCC TM -- TDM misconfiguration
BK -- Backup Connection ST -- Standby Connection
CB -- rcvd cell-bundle size bad SP -- Static Pseudowire
LD -- local site signaled down RS -- remote site standby
RD -- remote site signaled down HS -- hot standby
XX -- unknown

```

```
Legend for interface status
```

```
Up -- operational
```

```
Dn -- down
```

```
Neighbor: 10.255.245.51
```

```

Interface Type St Time last up # Up trans
ge-2/0/2.600(vc 5) rmt Up Dec 7 18:11:18 2009 1
 Remote PE: 10.255.245.51, Negotiated control-word: No
 Incoming label: 299856, Outgoing label: 299808
 Negotiated PW status TLV: No
 Local interface: ge-2/0/2.600, Status: Up, Encapsulation: VLAN

```

## Sample Output

### show l2circuit connections interface

```

user@host> show l2circuit connections interface t1-2/0/0:1:1.0
Layer-2 Circuit Connections:

Legend for connection status (St)
EI -- encapsulation invalid NP -- interface h/w not present
MM -- mtu mismatch Dn -- down
EM -- encapsulation mismatch VC-Dn -- Virtual circuit Down
CM -- control-word mismatch Up -- operational
VM -- vlan id mismatch CF -- Call admission control failure
OL -- no outgoing label IB -- TDM incompatible bitrate
NC -- intf encaps not CCC/TCC TM -- TDM misconfiguration
BK -- Backup Connection ST -- Standby Connection
CB -- rcvd cell-bundle size bad SP -- Static Pseudowire
LD -- local site signaled down RS -- remote site standby
RD -- remote site signaled down HS -- hot standby
XX -- unknown

Legend for interface status
Up -- operational
Dn -- down
Neighbor: 10.1.1.1
 Interface Type St Time last up # Up trans
 t1-2/0/0:1:1.0(vc 1)(SP) rmt Up Apr 27 04:21:02 2011 1
 Remote PE: 10.1.1.1, Negotiated control-word: Yes (Non-null)
 Incoming label: 1010001, Outgoing label: 1000001
 Negotiated PW status TLV: No
 Local interface: t1-1/0/0:1:1.0, Status: Up, Encapsulation: SATOP-T1,
APS-active
 Local interface: t1-2/0/0:1:1.0, Status: Up, Encapsulation: SATOP-T1,
APS-inactive

```

## Sample Output

### show l2circuit connections extensive

```

user@host>show l2circuit connections extensive
Layer-2 Circuit Connections:

Legend for connection status (St)
EI -- encapsulation invalid NP -- interface h/w not present
MM -- mtu mismatch Dn -- down
EM -- encapsulation mismatch VC-Dn -- Virtual circuit Down
CM -- control-word mismatch Up -- operational
VM -- vlan id mismatch CF -- Call admission control failure
OL -- no outgoing label IB -- TDM incompatible bitrate
NC -- intf encaps not CCC/TCC TM -- TDM misconfiguration
BK -- Backup Connection ST -- Standby Connection
CB -- rcvd cell-bundle size bad SP -- Static Pseudowire
LD -- local site signaled down RS -- remote site standby
RD -- remote site signaled down HS -- hot standby
XX -- unknown

Legend for interface status
Up -- operational
Dn -- down
Neighbor: 10.255.49.149
 Interface Type St Time last up # Up trans

```

```

ae0.0(vc 100) rmt Up Aug 31 09:36:12 2009 1
Remote PE: 10.255.49.149, Negotiated control-word: Yes (Null)
Incoming label: 299824, Outgoing label: 299776
Negotiated PW status TLV: Yes
Local PW status code: 0x00000000, Neighbor PW status code: 0x00000000
Local interface: ae0.0, Status: Up, Encapsulation: ETHERNET
Connection protection: Yes
Connection History:
 Aug 31 09:36:12 2009 status update timer
 Aug 31 09:36:12 2009 PE route changed
 Aug 31 09:36:12 2009 Out lbl Update 299776
 Aug 31 09:36:12 2009 In lbl Update 299824
 Aug 31 09:36:12 2009 loc intf up ae0.0

```

## Sample Output

### show l2circuit connections extensive (Pseudowire Redundancy with Hot Standby)

```
user@host>show l2circuit connections extensive
```

Layer-2 Circuit Connections:

Legend for connection status (St)

|                                 |                                      |
|---------------------------------|--------------------------------------|
| EI -- encapsulation invalid     | NP -- interface h/w not present      |
| MM -- mtu mismatch              | Dn -- down                           |
| EM -- encapsulation mismatch    | VC-Dn -- Virtual circuit Down        |
| CM -- control-word mismatch     | Up -- operational                    |
| VM -- vlan id mismatch          | CF -- Call admission control failure |
| OL -- no outgoing label         | IB -- TDM incompatible bitrate       |
| NC -- intf encaps not CCC/TCC   | TM -- TDM misconfiguration           |
| BK -- Backup Connection         | ST -- Standby Connection             |
| CB -- rcvd cell-bundle size bad | SP -- Static Pseudowire              |
| LD -- local site signaled down  | RS -- remote site standby            |
| RD -- remote site signaled down | HS -- Hot-standby Connection         |
| XX -- unknown                   |                                      |

Legend for interface status

Up -- operational

Dn -- down

Neighbor: 88.0.0.101

```

Interface Type St Time last up # Up trans
ge-1/3/2.600(vc 1) rmt Up Jan 24 11:00:26 2013 1
Remote PE: 88.0.0.101, Negotiated control-word: Yes (Null)
Incoming label: 299776, Outgoing label: 299776
Negotiated PW status TLV: Yes
Local PW status code: 0x00000000, Neighbor PW status code: 0x00000000
Local interface: ge-1/3/2.600, Status: Up, Encapsulation: VLAN
Connection History:
 Jan 24 11:00:26 2013 status update timer
 Jan 24 11:00:26 2013 PE route changed
 Jan 24 11:00:26 2013 Out lbl Update 299776
 Jan 24 11:00:26 2013 In lbl Update 299776
 Jan 24 11:00:26 2013 loc intf up ge-1/3/2.600

```

Neighbor: 88.0.0.102

```

Interface Type St Time last up # Up trans
ge-1/3/2.600(vc 2) rmt HS ----- ----
Remote PE: 88.0.0.102, Negotiated control-word: Yes (Null)
Incoming label: 299792, Outgoing label: 299776
Negotiated PW status TLV: Yes
Local PW status code: 0x00000020, Neighbor PW status code: 0x00000000
Local interface: ge-1/3/2.600, Status: Up, Encapsulation: VLAN

```



## show l2vpn connections

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show l2vpn connections</code><br><code>&lt;brief   extensive&gt;</code><br><code>&lt;down   up   up-down&gt;</code><br><code>&lt;history&gt;</code><br><code>&lt;instance <i>instance</i>&gt;</code><br><code>&lt;instance-history&gt;</code><br><code>&lt;local-site <i>local-site</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;remote-site <i>remote-site</i>&gt;</code><br><code>&lt;status&gt;</code><br><code>&lt;summary&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br><b>instance-history</b> option introduced in Junos OS Release 12.3R2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display Layer 2 virtual private network (VPN) connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <b>none</b> —Display all Layer 2 VPN connections for all routing instances.<br><br><b>brief   extensive</b> —(Optional) Display the specified level of output.<br><br><b>down   up   up-down</b> —(Optional) Display nonoperational, operational, or both kinds of connections.<br><br><b>history</b> —(Optional) Display information about connection history.<br><br><b>instance <i>instance</i></b> —(Optional) Display connections for the specified routing instance only.<br><br><b>instance-history</b> —(Optional) Display information about connection history for a particular instance.<br><br><b>local-site <i>local-site</i></b> —(Optional) Display connections for the specified Layer 2 VPN local site name or ID only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>remote-site <i>remote-site</i></b> —(Optional) Display connection for the specified Layer 2 VPN remote site ID only.<br><br><b>status</b> —(Optional) Display information about the connection and interface status.<br><br><b>summary</b> —(Optional) Display summary of all Layer 2 VPN connections information. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show l2vpn connections on page 2151</a><br><a href="#">show l2vpn connections extensive on page 2152</a><br><a href="#">show l2vpn connections extensive (VPWS) on page 2152</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Output Fields** Table 225 on page 2149 lists the output fields for the **show l2vpn connections** command. Output fields are listed in the approximate order in which they appear.

**Table 225: show l2vpn connections Output Fields**

| Field Name                        | Field Description                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>                   | Name of Layer 2 VPN instance.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>L2vpn-id</b>                   | For BGP autodiscovery, a globally unique Layer 2 VPN community identifier for the instance.                                                                                                                                                                                                                                                                                                    |
| <b>Local-ID</b>                   | BGP <b>local-address</b> assigned to the local routing device.                                                                                                                                                                                                                                                                                                                                 |
| <b>Local site</b>                 | Name of local site.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Local source-attachment-id</b> | For FEC 129, the VPWS source attachment identifier. The point-to-point nature of VPWS requires that you specify the source access individual identifier (SAII) and the target access individual identifier (TAII). This SAII-TAII pair defines a unique pseudowire between two PE devices.                                                                                                     |
| <b>Target-attachment-id</b>       | For FEC 129, the VPWS target attachment identifier. If the configured target identifier matches a source identifier advertised by a remote PE device by way of a BGP auto-discovery message, the pseudowire between that source-target pair is signaled. If there is no match between an advertised source identifier and the configured target identifier, the pseudowire is not established. |
| <b>Interface name</b>             | Name of interface.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Remote Site ID</b>             | Remote site ID.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Label Offset</b>               | Numbers within the label block that are skipped to find the next label base.                                                                                                                                                                                                                                                                                                                   |
| <b>Label-base</b>                 | Advertises the first label in a block of labels. A remote PE router uses this first label when sending traffic toward the advertising PE router.                                                                                                                                                                                                                                               |
| <b>Range</b>                      | Advertises the label block size.                                                                                                                                                                                                                                                                                                                                                               |
| <b>status-vector</b>              | Bit vector advertising the state of local PE-CE circuits to remote PE routers. A bit value of <b>0</b> indicates that the local circuit and LSP tunnel to the remote PE router are up, whereas a value of <b>1</b> indicates either one or both are down.                                                                                                                                      |
| <b>connection-site</b>            | Name of the connection site.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Type</b>                       | Type of connection: <b>loc</b> (local) or <b>rmt</b> (remote).                                                                                                                                                                                                                                                                                                                                 |
| <b>St</b>                         | Status of the connection. (For a list of possible values, see the <b>Legend for connection status (St)</b> field.)                                                                                                                                                                                                                                                                             |
| <b>Time last up</b>               | Time that the connection was last in the <b>Up</b> condition.                                                                                                                                                                                                                                                                                                                                  |
| <b># Up trans</b>                 | Number of transitions from <b>Down</b> to <b>Up</b> condition.                                                                                                                                                                                                                                                                                                                                 |

Table 225: show l2vpn connections Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Local circuit</b>  | Address and status of local circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Remote circuit</b> | Address and status of remote circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>St</b>             | <p>Status of the Layer 2 VPN connection (corresponds with Legend for Connection Status):</p> <ul style="list-style-type: none"> <li>• <b>EI</b>—The local Layer 2 VPN interface is configured with an encapsulation that is not supported.</li> <li>• <b>EM</b>—The encapsulation type received on this Layer 2 VPN connection from the neighbor does not match the local Layer 2 VPN connection interface encapsulation type.</li> <li>• <b>VC-Dn</b>—The virtual circuit is currently down.</li> <li>• <b>CM</b>—The two routers do not agree on a control word, which causes a control word mismatch.</li> <li>• <b>CN</b>—The virtual circuit is not provisioned properly.</li> <li>• <b>OR</b>—The label associated with the virtual circuit is out of range.</li> <li>• <b>OL</b>—No advertisement has been received for this virtual circuit from the neighbor. There is no outgoing label available for use by this virtual circuit.</li> <li>• <b>LD</b>—All of the CE-facing interfaces to the local site are down. Therefore, the connection to the local site is signaled as down to the other PE routers. No pseudowires can be established.</li> <li>• <b>RD</b>—All the interfaces to the remote neighbor are down. Therefore, the remote site has been signaled as down to the other PE routers. No pseudowires can be established.</li> <li>• <b>LN</b>—The local site has lost path selection to the remote site and therefore no pseudowires can be established from this local site.</li> <li>• <b>RN</b>—The remote site has lost path selection to a local site or other remote site and therefore no pseudowires are established to this remote site.</li> <li>• <b>XX</b>—The Layer 2 VPN connection is down for an unknown reason. This is a programming error.</li> <li>• <b>NC</b>—The interface encapsulation is not configured as an appropriate CCC, TCC, or Layer 2 VPN encapsulation.</li> <li>• <b>WE</b>—The encapsulation configured for the interface does not match the encapsulation configured for the associated connection within the Layer 2 VPN routing instance.</li> <li>• <b>NP</b>—The router detects that interface hardware is not present. The hardware might be offline, a PIC might not be of the desired type, or the interface might be configured in a different routing instance.</li> <li>• <b>-&gt;</b>—Only the outbound connection is up.</li> <li>• <b>&lt;-</b>—Only the inbound connection is up.</li> <li>• <b>Up</b>—The Layer 2 VPN connection is operational.</li> <li>• <b>Dn</b>—The Layer 2 VPN connection is down.</li> <li>• <b>CF</b>—The router cannot find enough bandwidth to the remote router to satisfy the Layer 2 VPN connection bandwidth requirement.</li> <li>• <b>SC</b>—The local site identifier matches the remote site identifier. No pseudowire can be established between these two sites. You should configure different values for the local and remote site identifiers.</li> </ul> |



Table 225: show l2vpn connections Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | <ul style="list-style-type: none"> <li><b>LM</b>—The local site identifier is not the minimum designated, meaning it is not the lowest. There is another local site with a lower site identifier. Pseudowires are not being established to this local site, and the associated local site identifier is not being used to distribute Layer 2 VPN label blocks. However, this is not an error state. Traffic continues to be forwarded to the PE router interfaces connected to the local sites when the local sites are in this state.</li> <li><b>RM</b>—The remote site identifier is not the minimum designated, meaning it is not the lowest. There is another remote site connected to the same PE router which has lower site identifier. The PE router cannot establish a pseudowire to this remote site and the associated remote site identifier cannot be used to distribute VPLS label blocks. However, this is not an error state. Traffic can continue to be forwarded to the PE router interface connected to this remote site when the remote site is in this state.</li> <li><b>IL</b>—The incoming packets for the Layer 2 VPN connection have no MPLS label.</li> </ul> |
| Remote PE         | Address of the remote provider edge router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Incoming label    | Name of the incoming label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Outgoing label    | Name of the outgoing label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Egress Protection | Whether the given PVC is protected by connection protection logic using egress protection for BGP signaled layer 2 services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Time              | Date and time of Layer 2 VPN connection event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Event             | Type of event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Interface/Lbl/PE  | Interface, label, or PE router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### show l2vpn connections

```

user@host> show l2vpn connections
L2VPN Connections :
Instance : vpna
Edge protection: Not-Primary
Local site: 2 (ce-2)
offset: 1, range: 3, label-base: 32768
 connection-site Type St Time last up # Up trans
 3 (3) loc Up Jul 18 20:45:46 2001 1
 Local circuit: fe-0/0/0.1, Status: Up
 Remote circuit: fe-0/0/3.0, Status: Up
 1 rmt Up Jul 18 21:47:25 2001 1
 Local circuit: fe-0/0/0.0, Status: Up
 Remote PE: 192.0.2.1
 Incoming label: 32768, Outgoing label: 32769
Local site: 3 (ce-3)
offset: 1, range: 2, label-base: 33792
 connection-site Type St Time last up # Up trans

```

```

2 (ce-b) loc Up Jul 18 20:45:46 2001 1
 Local circuit: fe-0/0/0.1, Status: Up
 Remote circuit: fe-0/0/3.0, Status: Up
1 rmt Up Jul 18 21:47:25 2001 1
 Local circuit: fe-0/0/3.1, Status: Up
 Remote PE: 192.0.2.1
 Incoming label: 33792, Outgoing label: 32770

```

### show l2vpn connections extensive

```

user@host> show l2vpn connections extensive
L2VPN Connections:
Instance: vpn-a
Edge protection: Not-Primary
Local site: ce-a (1)
 Interface name Remote Site ID
 fe-0/0/0.0 2
 Label Offset Offset Range
 32768 1 2
 connection-site Type St Time last up # Up trans
 2 rmt Up Aug 3 00:08:14 2001 1
 Local circuit: fe-0/0/0.0, Status: Up
 Remote PE: 192.168.24.1
 Incoming label: 32769, Outgoing label: 32768
 Egress Protection: Yes
 Time Event Interface/Lbl/PE
 Aug 3 00:08:14 2001 PE route up
 Aug 3 00:08:14 2001 Out lbl Update 32768
 Aug 3 00:08:14 2001 In lbl Update 32769
 Aug 3 00:08:14 2001 ckt0 up fe-0/0/0.0

```

### show l2vpn connections extensive (VPWS)

```

user@host> show l2vpn connections
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch WE -- interface and instance encaps not same
VC-Dn -- Virtual circuit down NP -- interface hardware not present
CM -- control-word mismatch -> -- only outbound connection is up
CN -- circuit not provisioned <- -- only inbound connection is up
OR -- out of range Up -- operational
OL -- no outgoing label Dn -- down
LD -- local site signaled down CF -- call admission control failure
RD -- remote site signaled down SC -- local and remote site ID collision
LN -- local site not designated LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unknown connection status IL -- no incoming label
MM -- MTU mismatch MI -- Mesh-Group ID not available
BK -- Backup connection ST -- Standby connection
PF -- Profile parse failure PB -- Profile busy
RS -- remote site standby SN -- Static Neighbor
LB -- Local site not best-site RB -- Remote site not best-site
VM -- VLAN ID mismatch

Legend for interface status
Up -- operational
Dn -- down

Instance: FEC129-VPWS

```

```

L2vpn-id: 100:100
 Number of local interfaces: 1
 Number of local interfaces up: 1
 ge-2/0/5.0
Local source-attachment-id: 1 (ONE)
 Target-attachment-id Type St Time last up # Up trans
 2 rmt Up Nov 28 16:16:14 2012 1
 Remote PE: 198.51.100.2, Negotiated control-word: No
 Incoming label: 299792, Outgoing label: 299792
 Local interface: ge-2/0/5.0, Status: Up, Encapsulation: ETHERNET
Connection History:
 Nov 28 16:16:14 2012 status update timer
 Nov 28 16:16:14 2012 PE route changed
 Nov 28 16:16:14 2012 Out lbl Update 299792
 Nov 28 16:16:14 2012 In lbl Update 299792
 Nov 28 16:16:14 2012 loc intf up ge-2/0/5.0

```

## show mvpn c-multicast

|                                 |                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvpn c-multicast<br><extensive   summary><br><instance-name <i>instance-name</i> ><br><source-pe>                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.<br>Option to show <b>source-pe</b> introduced in Junos OS Release 15.1.                                                                                                                                                                                   |
| <b>Description</b>              | Display the multicast VPN customer multicast route information.                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>instance-name <i>instance-name</i></b>—(Optional) Display output for the specified routing instance.</p> <p><b>source-pe</b>—(Optional) Display source-pe output for the specified c-multicast entries.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show mvpn c-multicast on page 2155</a><br><a href="#">show mvpn c-multicast summary on page 2155</a><br><a href="#">show mvpn c-multicast extensive on page 2155</a><br><a href="#">show mvpn c-multicast source-pe on page 2156</a>                                                      |
| <b>Output Fields</b>            | Table 226 on page 2154 lists the output fields for the <b>show mvpn c-multicast</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                  |

Table 226: show mvpn c-multicast Output Fields

| Field Name                          | Field Description                                                                                                                                                                                                                     | Level of Output                  |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Instance</b>                     | Name of the VPN routing instance.                                                                                                                                                                                                     | <b>summary extensive</b><br>none |
| <b>C-mcast IPv4 (S:G)</b>           | Customer router IPv4 multicast address.                                                                                                                                                                                               | <b>extensive</b> none            |
| <b>Ptnl</b>                         | Provider tunnel attributes, <i>tunnel type:tunnel source, tunnel destination group</i> .                                                                                                                                              | <b>extensive</b> none            |
| <b>St</b>                           | State: <ul style="list-style-type: none"> <li><b>DS</b>—Represents (S,G) and is created due to (*,G)</li> <li><b>RM</b>—Remote VPN route learned from the remote PE router</li> <li><b>St</b> display blank—SSM group join</li> </ul> | <b>extensive</b> none            |
| <b>MVPN instance</b>                | Name of the multicast VPN routing instance                                                                                                                                                                                            | <b>extensive</b> none            |
| <b>C-multicast IPv4 route count</b> | Number of customer multicast IPv4 routes associated with the multicast VPN routing instance.                                                                                                                                          | <b>summary</b>                   |

Table 226: show mvpn c-multicast Output Fields (*continued*)

| Field Name                   | Field Description                                                                            | Level of Output |
|------------------------------|----------------------------------------------------------------------------------------------|-----------------|
| C-multicast IPv6 route count | Number of customer multicast IPv6 routes associated with the multicast VPN routing instance. | summary         |

## Sample Output

### show mvpn c-multicast

```

user@host> show mvpn c-multicast
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
 C-mcast IPv4 (S:G) Ptnl St
 192.168.195.78/32:225.5.5.5/32 PIM-SM:10.255.14.144, 239.1.1.1 RM
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
 C-mcast IPv4 (S:G) Ptnl St
 192.168.195.94/32:226.6.6.6/32 PIM-SM:10.255.14.144, 239.2.0.0 RM

```

### show mvpn c-multicast summary

```

user@host> show mvpn c-multicast summary
MVPN Summary:
Family: INET
Family: INET6

Instance: mvpn1
 C-multicast IPv6 route count: 1

```

### show mvpn c-multicast extensive

```

user@host> show mvpn c-multicast extensive
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
 C-mcast IPv4 (S:G) Ptnl St
 192.168.195.78/32:225.5.5.5/32 PIM-SM:10.255.14.144, 239.1.1.1 RM
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

```

Legend for c-multicast routes properties (Pr)  
DS -- derived from (\*, c-g)                      RM -- remote VPN route  
Instance: VPN-B  
C-mcast IPv4 (S:G)                      Ptnl                      St  
192.168.195.94/32:226.6.6.6/32 PIM-SM:10.255.14.144, 239.2.0.0                      RM

#### show mvpn c-multicast source-pe

```
user@host> show mvpn c-multicast source-pe
Family : INET
Family : INET6

Instance : mvpn1
MVPN Mode : RPT-SPT
C-Multicast route address: ::/0:ff05::1/128
MVPN Source-PE1:
 extended-community: no-advertise target:10.1.0.0:9
 Route Distinguisher: 10.1.0.0:1
 Autonomous system number: 1
 Interface: ge-0/0/9.1 Index: 343
PIM Source-PE1:
 extended-community: target:10.1.0.0:9
 Route Distinguisher: 10.1.0.0:1
 Autonomous system number: 1
 Interface: ge-0/0/9.1 Index: 343
```

## show mvpn instance

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show mvpn instance &lt;instance-name&gt; &lt;display-tunnel-name&gt; &lt;extensive   summary&gt; &lt;inet   inet6&gt; &lt;logical-system&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 8.4.</p> <p>Additional details in output for extensive option introduced in Junos OS Release 15.1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display the multicast VPN routing instance information according the options specified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>instance-name</b>—(Optional) Display statistics for the specified routing instance, or press Enter without specifying an instance name to show output for all instances.</p> <p><b>display-tunnel-name</b>—(Optional) Display the ingress provider tunnel name rather than the attribute.</p> <p><b>extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display output for the specified IP type.</p> <p><b>logical-system</b>—(Optional) Display details for the specified logical system, or type “all”.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <p><a href="#">show mvpn instance on page 2158</a></p> <p><a href="#">show mvpn instance summary on page 2159</a></p> <p><a href="#">show mvpn instance extensive on page 2159</a></p>                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>            | Table 227 on page 2157 lists the output fields for the <b>show mvpn instance</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 227: show mvpn instance Output Fields

| Field Name                | Field Description                                                                                                                                   | Level of Output        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>MVPN instance</b>      | Name of the multicast VPN routing instance                                                                                                          | extensive none         |
| <b>Instance</b>           | Name of the VPN routing instance.                                                                                                                   | summary extensive none |
| <b>Provider tunnel</b>    | Provider tunnel attributes, <i>tunnel type:tunnel source, tunnel destination group</i> .                                                            | extensive none         |
| <b>Neighbor</b>           | Address, type of provider tunnel (I-P-tnl, inclusive provider tunnel and S-P-tnl, selective provider tunnel) and provider tunnel for each neighbor. | extensive none         |
| <b>C-mcast IPv4 (S:G)</b> | Customer IPv4 router multicast address.                                                                                                             | extensive none         |

Table 227: show mvpn instance Output Fields (*continued*)

| Field Name                          | Field Description                                                                                                                                                                                                                     | Level of Output       |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>C-mcast IPv6 (S:G)</b>           | Customer IPv6 router multicast address.                                                                                                                                                                                               | <b>extensive none</b> |
| <b>Ptnl</b>                         | Provider tunnel attributes, <i>tunnel type:tunnel source, tunnel destination group</i> .                                                                                                                                              | <b>extensive none</b> |
| <b>St</b>                           | State: <ul style="list-style-type: none"> <li><b>DS</b>—Represents (S,G) and is created due to (*,G)</li> <li><b>RM</b>—Remote VPN route learned from the remote PE router</li> <li><b>St</b> display blank—SSM group join</li> </ul> | <b>extensive none</b> |
| <b>Neighbor count</b>               | Number of neighbors associated with the multicast VPN routing instance.                                                                                                                                                               | <b>summary</b>        |
| <b>C-multicast IPv4 route count</b> | Number of customer multicast IPv4 routes associated with the multicast VPN routing instance.                                                                                                                                          | <b>summary</b>        |
| <b>C-multicast IPv6 route count</b> | Number of customer multicast IPv6 routes associated with the multicast VPN routing instance.                                                                                                                                          | <b>summary</b>        |

## Sample Output

### show mvpn instance

```

user@host> show mvpn instance
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
 Provider tunnel: I-P-tnl:PIM-SM:10.255.14.144, 239.1.1.1
 Neighbor
 10.255.14.160 I-P-tnl PIM-SM:10.255.14.160, 239.1.1.1
 10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
 C-mcast IPv4 (S:G) Ptnl St
 192.168.195.78/32:225.5.5.5/32 PIM-SM:10.255.14.144, 239.1.1.1 RM
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
 Provider tunnel: I-P-tnl:PIM-SM:10.255.14.144, 239.2.0.0
 Neighbor
 10.255.14.160 I-P-tnl PIM-SM:10.255.14.160, 239.2.0.0
 10.255.70.17 PIM-SM:10.255.70.17, 239.2.0.0
 C-mcast IPv4 (S:G) Ptnl St
 192.168.195.94/32:226.6.6.6/32 PIM-SM:10.255.14.144, 239.2.0.0 RM

```



## Sample Output

### show mvpn instance summary

```
user@host> show mvpn instance summary
MVPN Summary:
Family: INET
Family: INET6

Instance: mvpn1
 Sender-Based RPF: Disabled. Reason: Not enabled by configuration.
 Hot Root Standby: Disabled. Reason: Not enabled by configuration.
 Neighbor count: 3
 C-multicast IPv6 route count: 1
```

## Sample Output

### show mvpn instance extensive

```
user@host> show mvpn instance extensive
MVPN instance:
Family : INET

Instance : vpn_blue
 Customer Source: 10.1.1.1
 RT-Import Target: 192.168.1.1:100
 Route-Distinguisher: 192.168.1.1:100
 Source-AS: 65000
 Via unicast route: 10.1.0.0/16 in vpn-blue.inet.0
 Candidate Source PE Set:
 RT-Import 192.168.1.1:100, RD 1111:22222, Source-AS 65000
 RT-Import 192.168.2.2:100, RD 1111:22222, Source-AS 65000
 RT-Import 192.168.3.3:100, RD 1111:22222, Source-AS 65000

‘Extensive’ output will show everything in ‘detail’ output and add the list of
bound c-multicast routes.

> show mvpn source 10.1.1.1 instance vpn_blue extensive

Family : INET

Instance : vpn_blue
 Customer Source: 10.1.1.1
 RT-Import Target: 192.168.1.1:100
 Route-Distinguisher: 192.168.1.1:100
 Source-AS: 65000
 Via unicast route: 10.1.0.0/16 in vpn-blue.inet.0
 Candidate Source PE Set:
 RT-Import 192.168.1.1:100, RD 1111:22222, Source-AS 65000
 RT-Import 192.168.2.2:100, RD 1111:22222, Source-AS 65000
 RT-Import 192.168.3.3:100, RD 1111:22222, Source-AS 65000
 Customer-Multicast Routes:
 10.1.1.1/32:226.1.1.1/32
 10.1.1.1/32:226.1.1.1/32
```

## show mvpn neighbor

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show mvpn neighbor<br><extensive   summary><br><inet   inet6><br><instance <i>instance-name</i>   neighbor-address <i>address</i> ><br><logical-system <i>logical-system-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display multicast VPN neighbor information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>extensive   summary</b>—(Optional) Display the specified level of output for all multicast VPN neighbors.</p> <p><b>inet   inet6</b>—(Optional) Display IPv4 or IPv6 information for all multicast VPN neighbors.</p> <p><b>instance <i>instance-name</i>   neighbor-address <i>address</i></b>—(Optional) Display multicast VPN neighbor information for the specified instance or the specified neighbor.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display multicast VPN neighbor information for the specified logical system.</p>                                                 |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show mvpn neighbor on page 2161</a><br><a href="#">show mvpn neighbor extensive on page 2161</a><br><a href="#">show mvpn neighbor extensive on page 2161</a><br><a href="#">show mvpn neighbor instance-name on page 2162</a><br><a href="#">show mvpn neighbor neighbor-address on page 2162</a><br><a href="#">show mvpn neighbor neighbor-address summary on page 2162</a><br><a href="#">show mvpn neighbor neighbor-address extensive on page 2163</a><br><a href="#">show mvpn neighbor neighbor-address instance-name on page 2163</a><br><a href="#">show mvpn neighbor summary on page 2163</a> |
| <b>Output Fields</b>            | <a href="#">Table 228 on page 2160</a> lists the output fields for the <b>show mvpn neighbor</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Table 228: show mvpn neighbor Output Fields**

| Field Name             | Field Description                                                                                                                                   | Level of Output        |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>MVPN instance</b>   | Name of the multicast VPN routing instance                                                                                                          | extensive none         |
| <b>Instance</b>        | Name of the VPN routing instance.                                                                                                                   | summary extensive none |
| <b>Neighbor</b>        | Address, type of provider tunnel (I-P-tnl, inclusive provider tunnel and S-P-tnl, selective provider tunnel) and provider tunnel for each neighbor. | extensive none         |
| <b>Provider tunnel</b> | Provider tunnel attributes, <i>tunnel type:tunnel source, tunnel destination group</i> .                                                            | extensive none         |

## Sample Output

### show mvpn neighbor

```

user@host> show mvpn neighbor
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.1.1.1
10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.2.0.0
10.255.70.17 PIM-SM:10.255.70.17, 239.2.0.0

```

## Sample Output

### show mvpn neighbor extensive

```

user@host> show mvpn neighbor extensive
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.1.1.1
10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.2.0.0
10.255.70.17 PIM-SM:10.255.70.17, 239.2.0.0

```

### show mvpn neighbor extensive

```

user@host> show mvpn neighbor extensive

```

```
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: mvpn-a
Neighbor I-P-tnl
10.255.72.45
10.255.72.50 LDP P2MP:10.255.72.50, lsp-id 1
```

## Sample Output

### show mvpn neighbor instance-name

```
user@host> show mvpn neighbor instance-name VPN-A
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.1.1.1
10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
```

## Sample Output

### show mvpn neighbor neighbor-address

```
user@host> show mvpn neighbor neighbor-address 10.255.14.160
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.1.1.1
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
Neighbor I-P-tnl
10.255.14.160 PIM-SM:10.255.14.160, 239.2.0.0
```

## Sample Output

### show mvpn neighbor neighbor-address summary

```
user@host> show mvpn neighbor neighbor-address 10.255.70.17 summary
```

```
MVPN Summary:
Instance: VPN-A
Instance: VPN-B
```

## Sample Output

### show mvpn neighbor neighbor-address extensive

```
user@host> show mvpn neighbor neighbor-address 10.255.70.17 extensive
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-B
Neighbor I-P-tnl
10.255.70.17 PIM-SM:10.255.70.17, 239.2.0.0
```

## Sample Output

### show mvpn neighbor neighbor-address instance-name

```
user@host> show mvpn neighbor neighbor-address 10.255.70.17 instance-name VPN-A
MVPN instance:

Legend for provider tunnel
I-P-tnl -- inclusive provider tunnel S-P-tnl -- selective provider tunnel

Legend for c-multicast routes properties (Pr)
DS -- derived from (*, c-g) RM -- remote VPN route
Instance: VPN-A
Neighbor I-P-tnl
10.255.70.17 PIM-SM:10.255.70.17, 239.1.1.1
```

## Sample Output

### show mvpn neighbor summary

```
user@host> show mvpn neighbor summary
MVPN Summary:
Family: INET
Family: INET6

Instance: mvpn1
Neighbor count: 3
```

## show vpls connections

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show vpls connections</code><br><code>&lt;brief   extensive&gt;</code><br><code>&lt;down   up   up-down&gt;</code><br><code>&lt;history&gt;</code><br><code>&lt;instance <i>instance-name</i> local-site <i>local-site-name</i> remote-site <i>remote-site-name</i>&gt;</code><br><code>&lt;instance-history&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;status&gt;</code><br><code>&lt;summary&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br><b>instance-history</b> option introduced in Junos OS Release 12.3R2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | (T Series and M Series routers, except for the M160 router) Display virtual private LAN service (VPLS) connection information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b>none</b> —Display information about all VPLS connections for all routing instances.<br><br><b>brief   extensive</b> —(Optional) Display the specified level of output.<br><br><b>down   up   up-down</b> —(Optional) Display nonoperational, operational, or both types of connections.<br><br><b>history</b> —(Optional) Display information about connection history.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display the VPLS connections for the specified routing instance only.<br><br><b>instance-history</b> —(Optional) Display information about connection history for a particular instance.<br><br><b>local-site <i>local-site-name</i></b> —(Optional) Display the VPLS connections for the specified local site name or ID only.<br><br><b>remote-site <i>remote-site-name</i></b> —(Optional) Display the VPLS connections for the specified remote site name or ID only. Label block size information is always shown as 0 when using this option.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>status</b> —(Optional) Display information about the connection and interface status.<br><br><b>summary</b> —(Optional) Display summary of all VPLS connections information. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show vpls connections on page 2170</a><br><a href="#">show vpls connections (with multiple pseudowires) on page 2172</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

[show vpls connections extensive \(Static VPLS Neighbors\) on page 2173](#)

**Output Fields** [Table 229 on page 2165](#) lists the output fields for the **show vpls connections** command. Output fields are listed in the approximate order in which they appear.

**Table 229: show vpls connections Output Fields**

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>                      | Name of the VPLS instance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Local site</b>                    | Name of the local site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>VPLS-id</b>                       | Identifier for the VPLS site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Number of local interfaces</b>    | Number of interfaces configured for the local site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Number of local interfaces up</b> | Number of interfaces configured for the local site that are currently up.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>IRB interface present</b>         | Indicates whether or not an integrated routing and bridging (IRB) interface is present ( <b>yes</b> or <b>no</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Intf</b>                          | <p>List of all of the interfaces configured for the local site. The types of interfaces can include VPLS virtual loopback tunnel interfaces and label-switched interfaces. Any interface that supports VPLS could be listed here.</p> <p>Virtual loopback tunnel interfaces are displayed using the <b>vt-fpc/pic/port.nnnnn</b> format. Label-switched interfaces are displayed using the <b>lsi.nnnnn</b> format. In both cases, <b>nnnnn</b> is a dynamically generated virtual port used to transport and receive packets from other provider edge (PE) routers in the VPLS domain.</p> <p>Each interface might include the following information:</p> <ul style="list-style-type: none"> <li>• Identification as a VPLS interface</li> <li>• Name of the associated VPLS routing instance</li> <li>• Local site number</li> <li>• Remote site number</li> <li>• VPLS neighbor address</li> <li>• VPLS identifier</li> </ul> |
| <b>Interface flags</b>               | <p>Flag associated with the interface. Can include the following:</p> <ul style="list-style-type: none"> <li>• <b>VC-Down</b>—The virtual circuit associated with this interface is down.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Label-base</b>                    | First label in a block of labels. A remote PE router uses this first label when sending traffic toward the advertising PE router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Offset</b>                        | Displays the VPLS Edge (VE) block offset in the Layer 2 VPN NLRI. The VE block offset is used to identify a label block from which a particular label value is selected to setup a pseduowire for a remote site. The block offset value itself indicates the starting VE ID that maps to the label base contained in the VPLS NLRI advertisement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 229: show vpls connections Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Size</b>            | Label block size. A configurable value that represents the number of label blocks required to cover all the pseudowires for the remote peer. Acceptable configuration values are: <b>2</b> , <b>4</b> , <b>8</b> , and <b>16</b> . The default value is <b>2</b> . A value of <b>0</b> will be displayed when using the <b>remote-site</b> option.                                                                                          |
| <b>Range</b>           | Label block range.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Preference</b>      | Preference value advertised for a VPLS site. When multiple PE routers are assigned the same VE ID for multihoming, you might need to specify that a particular PE router acts as the designated forwarder by configuring the site preference value. The site preference indicates the degree of preference for a particular customer site. The site preference is one of the tie-breaking criteria used in a designated forwarder election. |
| <b>status-vector</b>   | Bit vector advertising the state of local PE-CE circuits to remote PE routers. A bit value of <b>0</b> indicates that the local circuit and LSP tunnel to the remote PE router are up, whereas a value of <b>1</b> indicates either one or both are down.                                                                                                                                                                                   |
| <b>connection-site</b> | Name of the connection site.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Neighbor</b>        | IP address and VPLS identifier for the VPLS neighbor.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Type</b>            | Type of connection: <b>loc</b> (local) or <b>rmt</b> (remote).                                                                                                                                                                                                                                                                                                                                                                              |



Table 229: show vpls connections Output Fields (*continued*)

| Field Name | Field Description |
|------------|-------------------|
| St         |                   |

Table 229: show vpls connections Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <p>Status of the VPLS connection (corresponds with Legend for Connection Status):</p> <ul style="list-style-type: none"> <li>• <b>EI</b>—The local VPLS interface is configured with an encapsulation that is not supported.</li> <li>• <b>EM</b>—The encapsulation type received on this VPLS connection from the neighbor does not match the local VPLS connection interface encapsulation type.</li> <li>• <b>VC-Dn</b>—The virtual circuit is currently down.</li> <li>• <b>CM</b>—The two routers do not agree on a control word, which causes a control word mismatch.</li> <li>• <b>CN</b>—The virtual circuit is not provisioned properly.</li> <li>• <b>OR</b>—The label associated with the virtual circuit is out of range.</li> <li>• <b>OL</b>—No advertisement has been received for this virtual circuit from the neighbor. There is no outgoing label available for use by this virtual circuit.</li> <li>• <b>LD</b>—All of the CE-facing interfaces to the local site are down. Therefore, the connection to the local site is signaled as down to the other PE routers. No pseudowires can be established.</li> <li>• <b>RD</b>—All the interfaces to the remote neighbor are down. Therefore, the remote site has been signaled as down to the other PE routers. No pseudowires can be established.</li> <li>• <b>LN</b>—The local site has lost path selection to the remote site and therefore no pseudowires can be established from this local site.</li> <li>• <b>RN</b>—The remote site has lost path selection to a local site or other remote site and therefore no pseudowires are established to this remote site.</li> <li>• <b>XX</b>—The VPLS connection is down for an unknown reason. This is a programming error.</li> <li>• <b>MM</b>—The MTU for the local site and the remote site do not match.</li> <li>• <b>BK</b>—The router is using a backup connection.</li> <li>• <b>PF</b>—Profile parse failure.</li> <li>• <b>RS</b>—The remote site is in a standby state.</li> <li>• <b>NC</b>—The interface encapsulation is not configured as an appropriate CCC, TCC, or VPLS encapsulation.</li> <li>• <b>WE</b>—The encapsulation configured for the interface does not match the encapsulation configured for the associated connection within the VPLS routing instance.</li> <li>• <b>NP</b>—The router detects that interface hardware is not present. The hardware might be offline, a PIC might not be of the desired type, or the interface might be configured in a different routing instance.</li> <li>• <b>-&gt;</b>—Only the outbound connection is up.</li> <li>• <b>&lt;-</b>—Only the inbound connection is up.</li> <li>• <b>Up</b>—The VPLS connection is operational.</li> <li>• <b>Dn</b>—The VPLS connection is down.</li> <li>• <b>CF</b>—The router cannot find enough bandwidth to the remote router to satisfy the VPLS connection bandwidth requirement.</li> <li>• <b>SC</b>—The local site identifier matches the remote site identifier. No pseudowire can be established between these two sites. You should configure different values for the local and remote site identifiers.</li> <li>• <b>LM</b>—The local site identifier is not the minimum designated, meaning it is not</li> </ul> |

Table 229: show vpls connections Output Fields (*continued*)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p>the lowest. There is another local site with a lower site identifier. Pseudowires are not being established to this local site, and the associated local site identifier is not being used to distribute VPLS label blocks. However, this is not an error state. Traffic continues to be forwarded to the PE router interfaces connected to the local sites when the local sites are in this state.</p> <ul style="list-style-type: none"> <li>• <b>RM</b>—The remote site identifier is not the minimum designated, meaning it is not the lowest. There is another remote site connected to the same PE router which has lower site identifier. The PE router cannot establish a pseudowire to this remote site and the associated remote site identifier cannot be used to distribute VPLS label blocks. However, this is not an error state. Traffic can continue to be forwarded to the PE router interface connected to this remote site when the remote site is in this state.</li> <li>• <b>IL</b>—The incoming packets for the VPLS connection have no MPLS label.</li> <li>• <b>MI</b>—The configured mesh group identifier is in use by another system in the network.</li> <li>• <b>ST</b>—The router has switched to a standby connection.</li> <li>• <b>PB</b>—Profile busy.</li> <li>• <b>SN</b>—The VPLS neighbor is static.</li> <li>• <b>PB</b>—Profile busy.</li> <li>• <b>SN</b>—The VPLS neighbor is static.</li> </ul> |
| <b>Time last up</b>             | Time connection was last in the <b>Up</b> condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b># Up trans</b>               | Number of transitions from <b>Down</b> to <b>Up</b> condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Status</b>                   | <p>Status of the (local or remote circuit) local interface:</p> <ul style="list-style-type: none"> <li>• <b>Up</b>—Operational</li> <li>• <b>Dn</b>—Down</li> <li>• <b>NP</b>—Not present</li> <li>• <b>DS</b>—Disabled</li> <li>• <b>WE</b>—Wrong encapsulation</li> <li>• <b>UN</b>—Uninitialized</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Encapsulation</b>            | Type of encapsulation: <b>VPLS</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Remote PE</b>                | Address of the remote provider edge router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Negotiated control-word</b>  | Whether a control word has been negotiated: <b>Yes</b> or <b>No</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Incoming label</b>           | Name of the incoming label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Outgoing label</b>           | Name of the outgoing label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Negotiated PW status TLV</b> | Indicates whether or not the pseudowire status TLV has been negotiated for the VPLS connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 229: show vpls connections Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Local interface</b>    | Provides the following information about the local interface configured for the VPLS neighbor: <ul style="list-style-type: none"> <li>• Name of the local interface</li> <li>• <b>Status</b>—Interface status (<b>Up</b> or <b>Down</b>)</li> <li>• <b>Encapsulation</b>—Interface encapsulation (for example, <b>ETHERNET</b>)</li> <li>• <b>Description</b>—Includes the VPLS instance name, the VPLS neighbor address, and the VPLS identifier</li> </ul> |
| <b>Time</b>               | Date and time of VPLS connection event.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Event</b>              | Type of event.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Interface/Lbl/PE</b>   | Interface, label, or PE router.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Connection History</b> | Each entry can include the date, time, year, and the connection event. Connection events include any of a variety of events related to VPLS connections, such as route changes, label updates, and interfaces going down or coming up.                                                                                                                                                                                                                       |

## Sample Output

### show vpls connections

```

user@host> show vpls connections
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch WE -- interface and instance encaps not same
VC-Dn -- Virtual circuit down NP -- interface hardware not present
CM -- control-word mismatch -< -- only outbound connection is up
CN -- circuit not provisioned >- -- only inbound connection is up
OR -- out of range Up -- operational
OL -- no outgoing label Dn -- down
LD -- local site signaled down CF -- call admission control failure
RD -- remote site signaled down SC -- local and remote site ID collision
LN -- local site not designated LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unn connection status IL -- no incoming label
MM -- MTU mismatch MI -- Mesh-Group ID not availble
BK -- Backup connection ST -- Standby connection
PF -- Profile parse failure PB -- Profile busy

Legend for interface status
Up -- operational
Dn -- down

Instance: vpls-1
Local site: 1 (11)
 Number of local interfaces: 1
 Number of local interfaces up: 1
 IRB interface present: no
 lt-1/3/0.10496

```

```

vt-1/3/0.1048588 1 Intf - vpls vpls-1 local site 11 remote site 1
vt-1/2/0.1048591 2 Intf - vpls vpls-1 local site 11 remote site 2
vt-1/2/0.1048585 3 Intf - vpls vpls-1 local site 11 remote site 3
vt-1/2/0.1048587 4 Intf - vpls vpls-1 local site 11 remote site 4
vt-1/2/0.1048589 5 Intf - vpls vpls-1 local site 11 remote site 5
vt-1/3/0.1048586 6 Intf - vpls vpls-1 local site 11 remote site 6
vt-1/3/0.1048590 7 Intf - vpls vpls-1 local site 11 remote site 7
vt-1/3/0.1048584 8 Intf - vpls vpls-1 local site 11 remote site 8

Label-base Offset Size Range Preference
+ 800256 1 16 16 100
Timer Values:
 Startup wait time: 120 seconds
 New site wait-time: 20 seconds
 Collision detect time: 30 seconds
 Reclaim wait time: 748 milliseconds
connection-site Type St Time last up # Up trans
1 rmt Up Apr 28 13:28:24 2009 2
 Remote PE: 124.1.2.1, Negotiated control-word: No
 Incoming label: 800256, Outgoing label: 800026
 Local interface: vt-1/3/0.1048588, Status: Up, Encapsulation: VPLS
 Description: Intf - vpls vpls-1 local site 11 remote site 1
Connection History:
 Apr 28 13:28:24 2009 status update timer
 Apr 28 13:28:24 2009 PE route down
 Apr 28 13:24:27 2009 status update timer
 Apr 28 13:24:27 2009 loc intf up vt-1/3/0.1048588
 Apr 28 13:24:27 2009 PE route changed
 Apr 28 13:24:27 2009 Out lbl Update 800026
 Apr 28 13:24:27 2009 In lbl Update 800256
 Apr 28 13:24:27 2009 loc intf down
2 rmt Up Apr 28 13:28:24 2009 2
 Remote PE: 124.1.7.1, Negotiated control-word: No
 Incoming label: 800257, Outgoing label: 800034
 Local interface: vt-1/2/0.1048591, Status: Up, Encapsulation: VPLS
 Description: Intf - vpls vpls-1 local site 11 remote site 2
Connection History:
 Apr 28 13:28:24 2009 status update timer
 Apr 28 13:28:24 2009 PE route down
 Apr 28 13:24:28 2009 status update timer
 Apr 28 13:24:28 2009 loc intf up vt-1/2/0.1048591
 Apr 28 13:24:28 2009 PE route changed
 Apr 28 13:24:28 2009 Out lbl Update 800034
 Apr 28 13:24:28 2009 In lbl Update 800257
 Apr 28 13:24:28 2009 loc intf down
3 rmt Up Apr 28 13:28:24 2009 2
 Remote PE: 124.1.4.1, Negotiated control-word: No
 Incoming label: 800258, Outgoing label: 800026
 Local interface: vt-1/2/0.1048585, Status: Up, Encapsulation: VPLS
 Description: Intf - vpls vpls-1 local site 11 remote site 3
Connection History:
 Apr 28 13:28:24 2009 status update timer
 Apr 28 13:28:24 2009 PE route down
 Apr 28 13:24:26 2009 status update timer

```

```

Apr 28 13:24:26 2009 loc intf up vt-1/2/0.1048585
Apr 28 13:24:26 2009 PE route changed
Apr 28 13:24:26 2009 Out lbl Update 800026
Apr 28 13:24:26 2009 In lbl Update 800258
Apr 28 13:24:26 2009 loc intf down
4 rmt Up Apr 28 13:28:24 2009 2
Remote PE: 124.1.6.1, Negotiated control-word: No
Incoming label: 800259, Outgoing label: 800026
Local interface: vt-1/2/0.1048587, Status: Up, Encapsulation: VPLS
Description: Intf - vpls vpls-1 local site 11 remote site 4
Connection History:
Apr 28 13:28:24 2009 status update timer
Apr 28 13:28:24 2009 PE route down
Apr 28 13:24:27 2009 status update timer
Apr 28 13:24:27 2009 loc intf up vt-1/2/0.1048587
Apr 28 13:24:27 2009 PE route changed
Apr 28 13:24:27 2009 Out lbl Update 800026
Apr 28 13:24:27 2009 In lbl Update 800259
Apr 28 13:24:27 2009 loc intf down
5 rmt Up Apr 28 13:28:24 2009 2
Remote PE: 124.1.3.1, Negotiated control-word: No
Incoming label: 800260, Outgoing label: 800034
Local interface: vt-1/2/0.1048589, Status: Up, Encapsulation: VPLS
Description: Intf - vpls vpls-1 local site 11 remote site 5
Connection History:
Apr 28 13:28:24 2009 status update timer
Apr 28 13:28:24 2009 PE route down
Apr 28 13:24:28 2009 status update timer
Apr 28 13:24:28 2009 loc intf up vt-1/2/0.1048589
Apr 28 13:24:28 2009 PE route changed
Apr 28 13:24:28 2009 Out lbl Update 800034
Apr 28 13:24:27 2009 In lbl Update 800260
Apr 28 13:24:27 2009 loc intf down

```

### show vpls connections (with multiple pseudowires)

user@host> show vpls connections

Layer-2 VPN connections:

Legend for connection status (St)

|                                  |                                                |
|----------------------------------|------------------------------------------------|
| EI -- encapsulation invalid      | NC -- interface encapsulation not CCC/TCC/VPLS |
| EM -- encapsulation mismatch     | WE -- interface and instance encaps not same   |
| VC-Dn -- Virtual circuit down    | NP -- interface hardware not present           |
| CM -- control-word mismatch      | -> -- only outbound connection is up           |
| CN -- circuit not provisioned    | <- -- only inbound connection is up            |
| OR -- out of range               | Up -- operational                              |
| OL -- no outgoing label          | Dn -- down                                     |
| LD -- local site signaled down   | CF -- call admission control failure           |
| RD -- remote site signaled down  | SC -- local and remote site ID collision       |
| LN -- local site not designated  | LM -- local site ID not minimum designated     |
| RN -- remote site not designated | RM -- remote site ID not minimum designated    |
| XX -- unknown connection status  | IL -- no incoming label                        |
| MM -- MTU mismatch               | MI -- Mesh-Group ID not available              |
| BK -- Backup connection          | ST -- Standby connection                       |
| PF -- Profile parse failure      | PB -- Profile busy                             |
| RS -- remote site standby        | SN -- Static Neighbor                          |
| LB -- Local site not best-site   | RB -- Remote site not best-site                |
| VM -- VLAN ID mismatch           |                                                |

Legend for interface status

Up -- operational

Dn -- down

Instance: vpls

VPLS-id: 100

Mesh-group connections: \_\_ves\_\_

| Neighbor                   | Type | St | Time last up         | # Up trans |
|----------------------------|------|----|----------------------|------------|
| 10.255.114.3 (vpls-id 100) | rmt  | Up | Apr 11 23:38:38 2013 | 1          |

Remote PE: 10.255.114.3, Negotiated control-word: No  
Incoming label: 262145, Outgoing label: 262145  
Negotiated PW status TLV: No  
Local interface: lsi.1049090, Status: Up, Encapsulation: ETHERNET  
Description: Intf - vpls h-vpls neighbor 10.255.114.3 vpls-id 100

Mesh-group connections: spokes

| Neighbor                   | Type | St | Time last up         | # Up trans |
|----------------------------|------|----|----------------------|------------|
| 10.255.114.4 (vpls-id 200) | rmt  | Up | Apr 11 23:39:25 2013 | 1          |
| 10.255.114.4 (vpls-id 201) | rmt  | Up | Apr 11 23:39:25 2013 | 1          |

Remote PE: 10.255.114.4, Negotiated control-word: No  
Incoming label: 262148, Outgoing label: 304224  
Negotiated PW status TLV: Yes  
Local PW status code: 0x00000000, Neighbor PW status code: 0x00000000  
Local interface: lsi.1049091, Status: Up, Encapsulation: ETHERNET  
Description: Intf - vpls h-vpls neighbor 10.255.114.4 vpls-id 200  
Remote PE: 10.255.114.4, Negotiated control-word: No  
Incoming label: 262149, Outgoing label: 304225  
Negotiated PW status TLV: Yes  
Local PW status code: 0x00000000, Neighbor PW status code: 0x00000000  
Local interface: lsi.1049096, Status: Up, Encapsulation: ETHERNET  
Description: Intf - vpls h-vpls neighbor 10.255.114.4 vpls-id 201

### show vpls connections extensive (Static VPLS Neighbors)

user@host> show vpls connections extensive instance red

Layer-2 VPN connections:

Legend for connection status (St)

|                                  |                                                |
|----------------------------------|------------------------------------------------|
| EI -- encapsulation invalid      | NC -- interface encapsulation not CCC/TCC/VPLS |
| EM -- encapsulation mismatch     | WE -- interface and instance encaps not same   |
| VC-Dn -- Virtual circuit down    | NP -- interface hardware not present           |
| CM -- control-word mismatch      | -> -- only outbound connection is up           |
| CN -- circuit not provisioned    | <- -- only inbound connection is up            |
| OR -- out of range               | Up -- operational                              |
| OL -- no outgoing label          | Dn -- down                                     |
| LD -- local site signaled down   | CF -- call admission control failure           |
| RD -- remote site signaled down  | SC -- local and remote site ID collision       |
| LN -- local site not designated  | LM -- local site ID not minimum designated     |
| RN -- remote site not designated | RM -- remote site ID not minimum designated    |
| XX -- unn connection status      | IL -- no incoming label                        |
| MM -- MTU mismatch               | MI -- Mesh-Group ID not availble               |
| BK -- Backup connection          | ST -- Standby connection                       |
| PF -- Profile parse failure      | PB -- Profile busy                             |
| RS -- remote site standby        | SN -- Static Neighbor                          |

Legend for interface status

Up -- operational

Dn -- down

Instance: static

VPLS-id: 1

Number of local interfaces: 1

Number of local interfaces up: 1

```

ge-0/0/5.0
lsi.1049344 Intf - vpls static neighbor 10.255.114.3 vpls-id
1
Neighbor Type St Time last up # Up trans
10.255.114.3(vpls-id 1)(SN) rmt Up Mar 4 08:48:41 2010 1
 Remote PE: 10.255.114.3, Negotiated control-word: No
 Incoming label: 29696, Outgoing label: 29697
 Negotiated PW status TLV: No
 Local interface: lsi.1049344, Status: Up, Encapsulation: ETHERNET
 Description: Intf - vpls static neighbor 10.255.114.3 vpls-id 1
Connection History:
 Mar 4 08:48:41 2010 status update timer
 Mar 4 08:48:41 2010 PE route changed
 Mar 4 08:48:41 2010 Out lbl Update 29697
 Mar 4 08:48:41 2010 In lbl Update 29696
 Mar 4 08:48:41 2010 loc intf up lsi.1049344

```

user@PE1> show vpls connections extensive (Multihoming with FEC 129)  
 Layer-2 VPN connections:

Legend for connection status (St)

|                                  |                                                |
|----------------------------------|------------------------------------------------|
| EI -- encapsulation invalid      | NC -- interface encapsulation not CCC/TCC/VPLS |
| EM -- encapsulation mismatch     | WE -- interface and instance encaps not same   |
| VC-Dn -- Virtual circuit down    | NP -- interface hardware not present           |
| CM -- control-word mismatch      | -> -- only outbound connection is up           |
| CN -- circuit not provisioned    | <- -- only inbound connection is up            |
| OR -- out of range               | Up -- operational                              |
| OL -- no outgoing label          | Dn -- down                                     |
| LD -- local site signaled down   | CF -- call admission control failure           |
| RD -- remote site signaled down  | SC -- local and remote site ID collision       |
| LN -- local site not designated  | LM -- local site ID not minimum designated     |
| RN -- remote site not designated | RM -- remote site ID not minimum designated    |
| XX -- unknown connection status  | IL -- no incoming label                        |
| MM -- MTU mismatch               | MI -- Mesh-Group ID not available              |
| BK -- Backup connection          | ST -- Standby connection                       |
| PF -- Profile parse failure      | PB -- Profile busy                             |
| RS -- remote site standby        | SN -- Static Neighbor                          |
| LB -- Local site not best-site   | RB -- Remote site not best-site                |
| VM -- VLAN ID mismatch           |                                                |

Legend for interface status

Up -- operational  
 Dn -- down

Instance: green

```

L2vpn-id: 100:100
Local-id: 1.1.1.2
 Number of local interfaces: 2
 Number of local interfaces up: 2
 ge-0/3/1.0
 ge-0/3/3.0
 lsi.101711873 Intf - vpls green local-id 1.1.1.2 remote-id
1.1.1.4 neighbor 1.1.1.4
 Remote-id Type St Time last up # Up trans
 1.1.1.4 rmt Up Jan 31 13:49:52 2012 1
 Remote PE: 1.1.1.4, Negotiated control-word: No
 Incoming label: 262146, Outgoing label: 262146
 Local interface: lsi.101711873, Status: Up, Encapsulation: ETHERNET
 Description: Intf - vpls green local-id 1.1.1.2 remote-id 1.1.1.4 neighbor
 1.1.1.4
 Connection History:

```



```
Jan 31 13:49:52 2012 status update timer
Jan 31 13:49:52 2012 PE route changed
Jan 31 13:49:52 2012 Out lbl Update 262146
Jan 31 13:49:52 2012 In lbl Update 262146
Jan 31 13:49:52 2012 loc intf up lsi.101711873

Multi-home:
Local-site Id Pref State
test 1 100 Up
Number of interfaces: 1
Number of interfaces up: 1
ge-0/3/1.0
Received multi-homing advertisements:
Remote-PE Pref flag Description
1.1.1.4 100 0x0
```

## show vpls flood event-queue

|                                 |                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show vpls flood event-queue                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.0.                                                                                                                                                |
| <b>Description</b>              | Display the pending events in the VPLS flood queue.                                                                                                                                        |
| <b>Options</b>                  | This command has no options.                                                                                                                                                               |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show vpls flood event-queue on page 2176</a>                                                                                                                                   |
| <b>Output Fields</b>            | <a href="#">Table 230 on page 2176</a> lists the output fields for the <b>show vpls flood event-queue</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 230: show vpls flood event-queue Output Fields**

| Field Name                   | Field Description                                                        |
|------------------------------|--------------------------------------------------------------------------|
| <b>Current Pending Event</b> | Provides information on the current event in the VPLS flood event queue. |
| <b>Name</b>                  | Name of the event.                                                       |
| <b>Owner Name</b>            | Name of the interface associated with the flood event.                   |
| <b>Pending Op</b>            | Pending operation for the event.                                         |
| <b>Last Error</b>            | Name of the last error encountered.                                      |
| <b>Number of Retries</b>     | Number of attempts made to update the event queue.                       |
| <b>Pending Event List</b>    | List of the events awaiting processing.                                  |
| <b>Event Name</b>            | Name of the event.                                                       |
| <b>Pending Op</b>            | Pending operation for the event.                                         |
| <b>Event Identifier</b>      | Name of the interface associated with the flood event.                   |

## Sample Output

### show vpls flood event-queue

```
user@host> show vpls flood event-queue
Current Pending Event
 Name: Flood Nexthop
 Owner Name: ge-4/3/0.0
 Pending Op: ADD
```

```
Last Error:ENOMEM
Number of Retries:3
Pending Event List:
Event Name Pending Op Event Identifier
Flood Nexthop ADD ge-4/3/0.0
Flood Route ADD ge-4/3/0.0
```

## show vpls flood instance

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show vpls flood instance<br><brief   detail   extensive><br><instance-name><br><logical-system <i>logical-system-name</i> >                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display VPLS information related to the flood process.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>none</b>—Display VPLS information related to the flood process for all routing instances.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance-name</b>—(Optional) Display VPLS information related to the flood process for the specified routing instance.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display VPLS information related to the flood process for the specified logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show vpls flood instance on page 2179</a><br><a href="#">show vpls flood instance logical-system-name on page 2179</a><br><a href="#">show vpls flood instance detail on page 2179</a>                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 231 on page 2178 lists the output fields for the <b>show vpls flood instance</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                    |

**Table 231: show vpls flood instance Output Fields**

| Field Name            | Field Description                                             |
|-----------------------|---------------------------------------------------------------|
| <b>Logical system</b> | Name of the logical system.                                   |
| <b>Name</b>           | Name of the VPLS routing instance.                            |
| <b>CEs</b>            | Number of CE routers connected to the VPLS instance.          |
| <b>VEs</b>            | Number of VE routers connected to the VPLS instance.          |
| <b>Flood routes</b>   | List of all flood routes associated with the VPLS instance.   |
| <b>Prefix</b>         | Prefix for the route.                                         |
| <b>Type</b>           | Type of route.                                                |
| <b>Owner</b>          | VPLS routing instance or interface associated with the route. |
| <b>Nhype</b>          | Next-hop type. For example, <b>flood</b> for a flood route.   |

Table 231: show vpls flood instance Output Fields (*continued*)

| Field Name | Field Description                    |
|------------|--------------------------------------|
| Nhindex    | Next-hop index number for the route. |

## Sample Output

### show vpls flood instance

```
user@host> show vpls flood instance

Logical system: __juniper_ls1__
Name: green
CEs: 1
VEs: 1
Flood Routes:
 Prefix Type Owner NhType NhIndex
 default ALL_CE_FLOOD green flood 383
 0x47/16 CE_FLOOD fe-1/2/1.0 flood 388
```

### show vpls flood instance logical-system-name

```
user@host: __juniper_ls1__> show vpls flood instance juniper_ls1

Logical system: __juniper_ls1__
Name: green
CEs: 1
VEs: 1
Flood Routes:
 Prefix Type Owner NhType NhIndex
 default ALL_CE_FLOOD green flood 383
 0x47/16 CE_FLOOD fe-1/2/1.0 flood 388
```

### show vpls flood instance detail

```
user@host: __juniper_ls1__> show vpls flood instance detail

Logical system: __juniper_ls1__
Name: green
CEs: 1
VEs: 1
Flood Routes:
 Prefix Type Owner NhType NhIndex
 default ALL_CE_FLOOD green flood 383
 0x47/16 CE_FLOOD fe-1/2/1.0 flood 388
```

## show vpls flood route

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show vpls flood route<br>(all-ce-flood instance-name <i>instance-name</i> <logical-system-name <i>logical-system-name</i> ><br> <br>ce-flood interface <i>interface-name</i> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 8.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Display VPLS route information related to the flood process for either the specified routing instance or the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <p><b>all-ce-flood</b>—Display the flood next-hop route for all customer edge routers for traffic coming from the core of the network.</p> <p><b>ce-flood interface <i>interface-name</i></b>—Display the flood next-hop route for traffic coming from the specified customer edge interface.</p> <p><b>instance-name <i>instance-name</i></b>—Display the flood routes for the specified instance.</p> <p><b>logical-system-name <i>logical-system-name</i></b>—(Optional) Specify the logical system whose flood routes you want to display. You can only specify the default logical system name for VPLS. The default logical system name is <b>__juniper_ls1__</b> (the name must be entered in the command with the underscore characters).</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show vpls flood route all-ce-flood on page 2181</a><br><a href="#">show vpls flood route ce-flood on page 2181</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | Table 232 on page 2180 lists the output for the <b>show vpls flood route</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table 232: show vpls flood route Output Fields**

| Field Name             | Field Description                                                     |
|------------------------|-----------------------------------------------------------------------|
| Flood route prefix     | Prefix for the flood route.                                           |
| Flood route type       | Type of flood route (either <b>CE_FLOOD</b> or <b>ALL_CE_FLOOD</b> ). |
| Flood route owner      | VPLS routing instance or interface associated with the flood route.   |
| Nexthop type           | Next-hop type. For example, <b>flood</b> for a flood route.           |
| Nexthop index          | Next-hop index number for the route.                                  |
| Interfaces flooding to | Interfaces to which VPLS routes are being flooded.                    |
| Name                   | Name of the interface.                                                |

Table 232: show vpls flood route Output Fields (*continued*)

| Field Name | Field Description                 |
|------------|-----------------------------------|
| Type       | Type of VPLS router (CE or VE).   |
| Nh type    | Next-hop type.                    |
| Index      | Index number for the flood route. |

## Sample Output

### show vpls flood route all-ce-flood

```
user@host:~juniper_ls1~> show vpls flood route all-ce-flood logical-system-name
~juniper_ls1_instance-name green
```

```
Flood route prefix: default
Flood route type: ALL_CE_FLOOD
Flood route owner: green
Nexthop type: flood
Nexthop index: 383
 Interfaces Flooding to:
 Name Type NhType Index
 fe-1/2/1.0 CE
```

### show vpls flood route ce-flood

```
user@host:~juniper_ls1~> show vpls flood route ce-flood interface fe-1/2/1.0
```

```
Flood route prefix: 0x47/16
Flood route type: CE_FLOOD
Flood route owner: fe-1/2/1.0
Nexthop type: flood
Nexthop index: 388
 Interfaces Flooding to:
 Name Type NhType Index
 lsi.49152 VE indr 262142
```

## show vpls mac-table

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <b>show vpls mac-table</b><br><b>&lt;brief   detail   extensive   summary&gt;</b><br><b>&lt;bridge-domain <i>bridge-domain-name</i>&gt;</b><br><b>&lt;instance <i>instance-name</i>&gt;</b><br><b>&lt;interface <i>interface-name</i>&gt;</b><br><b>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</b><br><b>&lt;mac-address&gt;</b><br><b>&lt;vlan-id <i>vlan-id-number</i>&gt;</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Release Information      | Command introduced in Junos OS Release 8.5.<br>Command introduced in Junos OS Release 15.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description              | Display learned virtual private LAN service (VPLS) media access control (MAC) address information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Options                  | <b>none</b> —Display all learned VPLS MAC address information.<br><br><b>brief   detail   extensive   summary</b> —(Optional) Display the specified level of output.<br><br><b>bridge-domain <i>bridge-domain-name</i></b> —(Optional) Display learned VPLS MAC addresses for the specified bridge domain.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display learned VPLS MAC addresses for the specified instance.<br><br><b>interface <i>interface-name</i></b> —(Optional) Display learned VPLS MAC addresses for the specified instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Display learned VPLS MAC addresses for all logical systems or for the specified logical system.<br><br><b>mac-address</b> —(Optional) Display the specified learned VPLS MAC address information..<br><br><b>vlan-id <i>vlan-id-number</i></b> —(Optional) Display learned VPLS MAC addresses for the specified VLAN. |
| Required Privilege Level | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| List of Sample Output    | <a href="#">show vpls mac-table on page 2183</a><br><a href="#">show vpls mac-table (with Layer 2 Services over GRE Interfaces) on page 2184</a><br><a href="#">show vpls mac-table (with VXLAN enabled) on page 2184</a><br><a href="#">show vpls mac-table count on page 2184</a><br><a href="#">show vpls mac-table detail on page 2185</a><br><a href="#">show vpls mac-table extensive on page 2185</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Output Fields            | <a href="#">Table 233 on page 2183</a> describes the output fields for the <b>show vpls mac-table</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 233: show vpls mac-table Output fields

| Field Name              | Field Description                                                                                                                                                                                                                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Routing instance        | Name of the routing instance.                                                                                                                                                                                                                                                                      |
| Bridging domain         | Name of the bridging domain.                                                                                                                                                                                                                                                                       |
| MAC address             | MAC address or addresses learned on a logical interface.                                                                                                                                                                                                                                           |
| MAC flags               | Status of MAC address learning properties for each interface: <ul style="list-style-type: none"> <li>• <b>S</b>—Static MAC address configured.</li> <li>• <b>D</b>—Dynamic MAC address learned.</li> <li>• <b>SE</b>—MAC accounting is enabled.</li> <li>• <b>NM</b>—Nonconfigured MAC.</li> </ul> |
| Logical interface       | Name of the logical interface.                                                                                                                                                                                                                                                                     |
| MAC count               | Number of MAC addresses learned on a specific routing instance or interface.                                                                                                                                                                                                                       |
| Learning interface      | Logical interface or logical Label Switched Interface (LSI) the address is learned on.                                                                                                                                                                                                             |
| Base learning interface | Base learning interface of the MAC address. This field is introduced in Junos OS Release 14.2.                                                                                                                                                                                                     |
| Learn VLAN ID/VLAN      | VLAN ID of the routing instance or bridge domain in which the MAC address was learned.                                                                                                                                                                                                             |
| VXLAN ID/VXLAN          | VXLAN Network Identifier (VNI)                                                                                                                                                                                                                                                                     |
| Layer 2 flags           | Debugging flags signifying that the MAC address is present in various lists.                                                                                                                                                                                                                       |
| Epoch                   | Spanning Tree Protocol epoch number identifying when the MAC address was learned. Used for debugging.                                                                                                                                                                                              |
| Sequence number         | Sequence number assigned to this MAC address. Used for debugging.                                                                                                                                                                                                                                  |
| Learning mask           | Mask of Packet Forwarding Engines where this MAC address was learned. Used for debugging.                                                                                                                                                                                                          |
| IPC generation          | Creation time of the logical interface when this MAC address was learned. Used for debugging.                                                                                                                                                                                                      |

## Sample Output

### show vpls mac-table

```

user@host> show vpls mac-table
MAC flags (S -static MAC, D -dynamic MAC,
 SE -Statistics enabled, NM -Non configured MAC)

Routing instance : vpls_ldp1
VLAN : 223
 MAC MAC Logical
 address flags interface
00:90:69:9c:1c:5d D ge-0/2/5.400

```

MAC flags (S -static MAC, D -dynamic MAC,  
SE -Statistics enabled, NM -Non configured MAC)

Routing instance : vpls\_red  
VLAN : 401

| MAC<br>address    | MAC<br>flags | Logical<br>interface |
|-------------------|--------------|----------------------|
| 00:00:aa:12:12:12 | D            | lsi.1051138          |
| 00:05:85:74:9f:f0 | D            | lsi.1051138          |

#### show vpls mac-table (with Layer 2 Services over GRE Interfaces)

user@host> show vpls mac-table  
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned  
SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : vpls\_4site:1000  
Bridging domain : \_\_vpls\_4site:1000\_\_, MAC

| MAC<br>address    | MAC<br>flags | Logical<br>interface |
|-------------------|--------------|----------------------|
| 00:01:01:00:01:f4 | D,SE         | ge-4/2/0.1000        |
| 00:02:01:33:01:f4 | D,SE         | lsi.1052004          |
| 00:03:00:32:01:f4 | D,SE         | lsi.1048840          |
| 00:04:00:14:01:f4 | D,SE         | lsi.1052005          |
| 00:02:01:33:02:f7 | D,SE         | gr-1/2/10.10         |

#### show vpls mac-table (with VXLAN enabled)

user@host> show vpls mac-table  
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned  
SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : vpls\_4site:1000  
Bridging domain : \_\_vpls\_4site:1000\_\_, VLAN : 4094,4093  
VXLAN: Id : 300, Multicast group: 226.1.1.3

| MAC<br>address    | MAC<br>flags | Logical<br>interface |
|-------------------|--------------|----------------------|
| 00:01:01:00:01:f4 | D,SE         | ge-4/2/0.1000        |
| 00:02:01:33:01:f4 | D,SE         | lsi.1052004          |
| 00:03:00:32:01:f4 | D,SE         | lsi.1048840          |
| 00:04:00:14:01:f4 | D,SE         | lsi.1052005          |
| 00:02:01:33:02:f7 | D,SE         | vtep.1052010         |
| 00:04:00:14:02:f7 | D,SE         | vtep.1052011         |

#### show vpls mac-table count

user@host> show vpls mac-table count  
0 MAC address learned in routing instance \_\_juniper\_private1\_\_

MAC address count per interface within routing instance:

| Logical interface | MAC count |
|-------------------|-----------|
| lc-0/0/0.32769    | 0         |
| lc-0/1/0.32769    | 0         |
| lc-0/2/0.32769    | 0         |
| lc-2/0/0.32769    | 0         |
| lc-0/3/0.32769    | 0         |
| lc-2/1/0.32769    | 0         |
| lc-9/0/0.32769    | 0         |
| lc-11/0/0.32769   | 0         |
| lc-2/2/0.32769    | 0         |
| lc-9/1/0.32769    | 0         |
| lc-11/1/0.32769   | 0         |

|                 |   |
|-----------------|---|
| 1c-2/3/0.32769  | 0 |
| 1c-9/2/0.32769  | 0 |
| 1c-11/2/0.32769 | 0 |
| 1c-11/3/0.32769 | 0 |
| 1c-9/3/0.32769  | 0 |

MAC address count per learn VLAN within routing instance:

| Learn VLAN ID | MAC count |
|---------------|-----------|
| 0             | 0         |

1 MAC address learned in routing instance vpls\_ldp1

MAC address count per interface within routing instance:

| Logical interface | MAC count |
|-------------------|-----------|
| lsi.1051137       | 0         |
| ge-0/2/5.400      | 1         |

MAC address count per learn VLAN within routing instance:

| Learn VLAN ID | MAC count |
|---------------|-----------|
| 0             | 1         |

1 MAC address learned in routing instance vpls\_red

MAC address count per interface within routing instance:

| Logical interface | MAC count |
|-------------------|-----------|
| ge-0/2/5.300      | 1         |

MAC address count per learn VLAN within routing instance:

| Learn VLAN ID | MAC count |
|---------------|-----------|
| 0             | 1         |

### show vpls mac-table detail

user@host> show vpls mac-table detail

MAC address: 00:90:69:9c:1c:5d

Routing instance: vpls\_ldp1

Learning interface: ge-0/2/5.400

Layer 2 flags: in\_ifd, in\_ifl, in\_vlan, kernel

Epoch: 0

Sequence number: 1

Learning mask: 0x1

IPC generation: 0

MAC address: 00:90:69:9c:1c:5d

Routing instance: vpls\_red

Learning interface: ge-0/2/5.300

Layer 2 flags: in\_ifd, in\_ifl, in\_vlan, kernel

Epoch: 0

Sequence number: 1

Learning mask: 0x1

IPC generation: 0

### show vpls mac-table extensive

user@host> show vpls mac-table extensive

MAC address: 00:10:00:01:00:00

Routing instance: vpls\_1

Bridging domain: \_\_vpls\_1\_\_, VLAN : NA

Learning interface: lsi.1049165

Base learning interface: lsi.1049165

Layer 2 flags: in\_hash, in\_ifd, in\_ifl, in\_vlan, in\_rtt, kernel, in\_ifbd

Epoch: 0

Sequence number: 1

Learning mask: 0x00000001

```
MAC address: 00:10:00:01:00:01
Routing instance: vpls_1
 Bridging domain: __vpls_1__, VLAN : NA
 Learning interface: lsi.1049165
 Base learning interface: lsi.1049165
 Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
 Epoch: 0 Sequence number: 1
 Learning mask: 0x00000001

MAC address: 00:10:00:01:00:02
Routing instance: vpls_1
 Bridging domain: __vpls_1__, VLAN : NA
 Learning interface: lsi.1049165
 Base learning interface: lsi.1049165
 Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
 Epoch: 0 Sequence number: 1
 Learning mask: 0x00000001

MAC address: 00:10:00:01:00:03
Routing instance: vpls_1
 Bridging domain: __vpls_1__, VLAN : NA
 Learning interface: lsi.1049165
 Base learning interface: lsi.1049165
 Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
 Epoch: 0 Sequence number: 1
 Learning mask: 0x00000001
```

## show vpls statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show vpls statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | (T Series and M Series routers, except for the M160 router) Display virtual private LAN service (VPLS) statistics.                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>none</b>—Display VPLS statistics for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display VPLS statistics for a specific VPLS routing instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>    | <a href="#">show vpls statistics on page 2188</a><br><a href="#">show vpls statistics instance on page 2188</a>                                                                                                                                                                                                                                             |
| <b>Output Fields</b>            | <a href="#">Table 234 on page 2187</a> lists the output fields for the <b>show vpls statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                         |

**Table 234: show vpls statistics Output Fields**

| Field Name                         | Field Description                                                                                                                                                                                                                                   |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>                    | Name of the VPLS instance.                                                                                                                                                                                                                          |
| <b>Local interface</b>             | Name of the local VPLS virtual loopback tunnel interface, <i>vt-fpc/plc/port.nnnnn</i> , where <i>nnnnn</i> is a dynamically generated virtual port used to transport and receive packets from other provider edge (PE) routers in the VPLS domain. |
| <b>Index</b>                       | Number associated with the next hop.                                                                                                                                                                                                                |
| <b>Remote provider edge router</b> | Address of the remote provider edge router.                                                                                                                                                                                                         |
| <b>Multicast packets</b>           | Number of multicast packets received.                                                                                                                                                                                                               |
| <b>Multicast bytes</b>             | Number of multicast bytes received.                                                                                                                                                                                                                 |
| <b>Flood packets</b>               | Number of VPLS flood packets received.                                                                                                                                                                                                              |
| <b>Flood bytes</b>                 | Number of VPLS flood bytes received.                                                                                                                                                                                                                |

Table 234: show vpls statistics Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Current MAC count | Number of MAC addresses learned by the interface and the configured maximum limit on the number of MAC addresses that can be learned. |

## Sample Output

### show vpls statistics

```

user@host> show vpls statistics

VPLS statistics:

Instance: green

 Local interface: fe-2/2/1.0, Index: 69
 Multicast packets: 1
 Multicast bytes : 60
 Flooded packets : 18
 Flooded bytes : 2556
 Current MAC count: 1

 Local interface: lt-0/3/0.2, Index: 72
 Multicast packets: 3
 Multicast bytes : 153
 Flooded packets : 1
 Flooded bytes : 51
 Current MAC count: 1

 Local interface: lsi.32769, Index: 75
 Current MAC count: 0

 Local interface: lsi.32771, Index: 77
 Remote PE: 10.255.14.222
 Current MAC count: 2

Instance: red

 Local interface: vt-0/3/0.32768, Index: 74
 Multicast packets: 0
 Multicast bytes : 0
 Flooded packets : 0
 Flooded bytes : 0
 Current MAC count: 0

 Local interface: vt-0/3/0.32770, Index: 76
 Multicast packets: 0
 Multicast bytes : 0
 Flooded packets : 0
 Flooded bytes : 0
 Current MAC count: 0

```

### show vpls statistics instance

```

user@host> show vpls statistics instance red

```

## Layer-2 VPN Statistics:

Instance: red

Local interface: vt-3/2/0.32768, Index: 73

Remote provider edge router: 10.255.17.35

|                    |              |
|--------------------|--------------|
| Multicast packets: | 0            |
| Multicast bytes :  | 0            |
| Flood packets :    | 0            |
| Flood bytes :      | 0            |
| Current MAC count: | 1 (Limit 20) |





## PART 6

# Index

- [Index on page 2193](#)



# Index

## Symbols

|                                               |          |
|-----------------------------------------------|----------|
| #, comments in configuration statements.....  | xliv     |
| ( ), in syntax descriptions.....              | xliv     |
| 10-Gigabit Ethernet interfaces                |          |
| MTU sizes.....                                | 98       |
| 10-Gigabit Ethernet LAN/WAN PIC               |          |
| no-pre-classifier statement.....              | 722      |
| oversubscribed Ethernet mode                  |          |
| control queue disable.....                    | 722      |
| 100-Gigabit Ethernet                          |          |
| configuration                                 |          |
| sa-multicast.....                             | 827      |
| vlan-rule.....                                | 938      |
| vlan-steering.....                            | 939      |
| forwarding-options                            |          |
| sa-multicast.....                             | 827      |
| vlan-steering.....                            | 939      |
| vlan-steering                                 |          |
| vlan-rule.....                                | 938      |
| 802.1Q VLANs                                  |          |
| dynamic.....                                  | 421      |
| mixed VLAN tagging.....                       | 555, 700 |
| VLAN IDs.....                                 | 930, 935 |
| VLAN tagging.....                             | 940      |
| 802.1Q/Ethernet 802.3 encapsulation           |          |
| encapsulation overhead.....                   | 101      |
| 802.1Q/Ethernet SNAP encapsulation            |          |
| encapsulation overhead.....                   | 101      |
| 802.1x Port-Based Network Access Control..... | 498      |
| 802.3ad statement.....                        | 383      |
| < >, in syntax descriptions.....              | xliv     |
| [ ], in configuration statements.....         | xliv     |
| { }, in configuration statements.....         | xliv     |
| (pipe), in syntax descriptions.....           | xliv     |

## A

|                                    |      |
|------------------------------------|------|
| accept statement.....              | 384  |
| accept-source-mac statement.....   | 386  |
| access option                      |      |
| show route protocol command.....   | 1987 |
| access-concentrator statement..... | 387  |

|                                              |          |
|----------------------------------------------|----------|
| access-internal option                       |          |
| show route protocol command.....             | 1987     |
| access-profile statement.....                | 388      |
| usage guidelines.....                        | 123, 126 |
| accounting statement.....                    | 389      |
| usage guidelines.....                        | 235      |
| accounting-profile statement.....            | 389      |
| acfc statement.....                          | 390      |
| usage guidelines.....                        | 129      |
| acknowledge-retries statement.....           | 391      |
| acknowledge-timer statement.....             | 392      |
| usage guidelines.....                        | 392      |
| action statement                             |          |
| OAM.....                                     | 392      |
| policer.....                                 | 393      |
| action-profile statement                     |          |
| applying to remote MEP.....                  | 393      |
| CFM.....                                     | 394      |
| LFM.....                                     | 395      |
| action-red-differential-delay statement..... | 396      |
| usage guidelines.....                        | 396      |
| address and control field compression.....   | 129      |
| address entries.....                         | 52       |
| address statement.....                       | 397      |
| usage guidelines.....                        | 187, 195 |
| Addresses, flags field, content.....         | 959      |
| advertise-interval statement.....            | 400      |
| advertisements See router advertisements     |          |
| ae                                           |          |
| physical part of interface name.....         | 27       |
| age statement.....                           | 401      |
| agent-specifier statement                    |          |
| PPPoE.....                                   | 402      |
| aggregate statement                          |          |
| hierarchical policer.....                    | 404      |
| aggregate-ports statement.....               | 405      |
| aggregated Ethernet                          |          |
| targeted distribution of subscribers.....    | 654, 879 |
| aggregated Ethernet interfaces               |          |
| CCC.....                                     | 260, 262 |
| Layer 2 VPNs.....                            | 262      |
| link speed.....                              | 106      |
| aggregated-ether-options statement.....      | 406      |
| aggregated-sonet-options statement.....      | 407      |
| alarm statement.....                         | 408      |
| alias statement.....                         | 409      |
| example configuration.....                   | 111      |
| all (tracing flag)                           |          |
| interfaces.....                              | 311      |

|                                            |                |
|--------------------------------------------|----------------|
| allow-any-vci statement.....               | 409            |
| allow-fragmentation statement.....         | 410            |
| allow-remote-loopback statement.....       | 410            |
| AMT                                        |                |
| displaying.....                            | 1484           |
| protocol, displaying.....                  | 1487           |
| state                                      |                |
| clearing.....                              | 1451           |
| statistics                                 |                |
| clearing.....                              | 1450           |
| tunnel                                     |                |
| clearing.....                              | 1451           |
| tunnel, displaying.....                    | 1489           |
| ANCP                                       |                |
| clearing statistics.....                   | 1342           |
| CoS state                                  |                |
| displaying ANCP.....                       | 1348           |
| local access loop                          |                |
| displaying.....                            | 1366           |
| neighbor                                   |                |
| clearing.....                              | 1340           |
| neighbor summary                           |                |
| displaying.....                            | 1373           |
| neighbors                                  |                |
| displaying.....                            | 1353           |
| request OAM per interface.....             | 1346           |
| request OAM per neighbor.....              | 1347           |
| statistics                                 |                |
| displaying.....                            | 1361           |
| subscriber                                 |                |
| clearing.....                              | 1344           |
| subscriber summary                         |                |
| displaying.....                            | 1375           |
| subscribers                                |                |
| displaying.....                            | 1366           |
| summary                                    |                |
| displaying.....                            | 1371           |
| annex statement.....                       | 411            |
| apply-action-profile statement.....        | 411            |
| aps statement.....                         | 412            |
| annex-b.....                               | 411            |
| arp option                                 |                |
| policers.....                              | 203            |
| arp statement.....                         | 413            |
| as                                         |                |
| physical part of interface name.....       | 27             |
| AS paths                                   |                |
| distribution of, displaying.....           | 1843           |
| domain information, displaying.....        | 1847           |
| matching regular expressions,              |                |
| displaying.....                            | 1870           |
| summary of, displaying.....                | 1850           |
| ASN                                        |                |
| BGP community routes, displaying.....      | 1878           |
| Asynchronous Transfer Mode See ATM         |                |
| asynchronous-notification statement.....   | 414, 707       |
| at                                         |                |
| physical part of interface name.....       | 27             |
| ATM cell-relay encapsulation               |                |
| encapsulation overhead.....                | 101            |
| ATM encapsulation                          |                |
| ATM PVC encapsulation.....                 | 101            |
| keepalives.....                            | 121            |
| Layer 2 switching cross-connects.....      | 249            |
| ATM interfaces                             |                |
| MTU sizes.....                             | 95, 96, 97, 99 |
| status information, displaying.....        | 992            |
| ATM PVC encapsulation.....                 | 101            |
| atm-encapsulation statement.....           | 415            |
| atm-options statement.....                 | 416            |
| atm-scheduler-map statement .....          | 417            |
| ATM-to-Ethernet interworking.....          | 254, 944       |
| VCI range.....                             | 928            |
| virtual path identifier.....               | 947            |
| VLAN tagging.....                          | 596, 929       |
| ATM2 IQ interfaces                         |                |
| MTU sizes.....                             | 97, 99         |
| authentication statement                   |                |
| dynamic VLAN authentication.....           | 418            |
| authentication-key statement.....          | 419            |
| authentication-profile-name statement..... | 419            |
| authenticator statement.....               | 420            |
| auto-configure statement.....              | 421            |
| auto-discovery statement.....              | 422            |
| auto-negotiation statement                 |                |
| Gigabit Ethernet.....                      | 423, 709       |
| auto-synchronize statement                 |                |
| usage guidelines.....                      | 302            |
| autonomous system number See ASN           |                |
| autonomous system paths See AS paths       |                |
| <b>B</b>                                   |                |
| backup PE groups                           |                |
| multicast, displaying.....                 | 1547           |
| backup-destination statement.....          | 424            |
| backup-interface statement.....            | 425            |
| backup-options statement.....              | 425            |

- bandwidth statement.....426
    - usage guidelines.....169
  - bandwidth-limit statement
    - hierarchical policer.....427
    - policer for Gigabit Ethernet interface.....428
  - bcm0
    - internal Ethernet interface.....4
    - physical part of interface name.....27
  - BERT
    - configuring interface diagnostics.....319
  - bert-algorithm statement.....429
    - usage guidelines.....319
  - bert-error-rate statement.....431
    - usage guidelines.....319
  - bert-period statement.....433
    - usage guidelines.....319
  - best routes, displaying.....1872
  - BFD
    - sessions
      - clearing.....1379
      - displaying.....1380
  - BGP
    - communities
      - policy, routing.....454
    - community ASN, displaying routes.....1878
    - community name, displaying routes.....1880
    - damping parameters
      - clearing.....1392
      - displaying.....1434
    - damping routes, displaying.....1882
    - groups
      - general information, displaying.....1400
      - traffic statistics, displaying.....1407
    - neighbors
      - clearing connections.....1393
      - displaying.....1409
    - summary information, displaying.....1428
    - table
      - clearing.....1396
  - BGP Monitoring Protocol
    - displaying
      - statistics.....1398
  - Bidirectional Forwarding Detection See BFD
  - bit error rate test See BERT
  - BOOTP
    - accepting packets.....225
  - bootstrap routers, displaying.....1591
  - borrower interface
    - unnumbered Ethernet or demux.....196
  - br
    - physical part of interface name.....27
  - braces, in configuration statements.....xliv
  - brackets
    - angle, in syntax descriptions.....xliv
    - square, in configuration statements.....xliv
  - bridge domain
    - Layer 2, displaying.....2103
  - bridge-domain statement.....434
  - broadcast statement.....435
    - usage guidelines.....187
  - buildout statement
    - E3 or T3 over ATM interfaces.....436
    - T1 interfaces.....437
  - bundle statement.....438
  - burst-size-limit statement
    - hierarchical policer.....439
    - policer for Gigabit Ethernet interface.....440
  - byte encoding.....441
  - byte-encoding statement.....441
  - bytes statement.....442
- C**
- C-bit parity mode.....444, 710
  - calculation-weight statement.....443
  - cau4
    - physical part of interface name.....27
  - cbit-parity statement.....444, 710
  - cbr statement.....445
  - CCC
    - aggregated Ethernet.....260, 262
    - encapsulation
      - VLAN-bundled dual-tag logical
        - interfaces.....941
      - VLAN-bundled single-tag logical
        - interfaces.....932
    - Layer 2 VPNs.....262
  - cel
    - physical part of interface name.....27
  - cell-bundle-size statement.....446
  - channel part of interface name.....33
  - channelized DS3-to-DS0 interfaces
    - status information, displaying.....1027
  - channelized DS3-to-DS1 interfaces
    - status information, displaying.....1038
  - channelized E1 interfaces
    - status information, displaying.....1045
  - channelized E1 IQ interfaces
    - status information, displaying.....1041

|                                                 |            |  |
|-------------------------------------------------|------------|--|
| channelized OC12 interfaces                     |            |  |
| status information, displaying.....             | 1060       |  |
| channelized OC12 IQ interfaces                  |            |  |
| status information, displaying.....             | 1056       |  |
| channelized OC12 IQE interfaces                 |            |  |
| status information, displaying.....             | 1056       |  |
| channelized OC3 IQ interfaces                   |            |  |
| status information, displaying.....             | 1064       |  |
| channelized OC3 IQE interfaces                  |            |  |
| status information, displaying.....             | 1064       |  |
| Channelized SONET/SDH OC3/STM1 (Multi-Rate)     |            |  |
| interfaces                                      |            |  |
| MTU sizes.....                                  | 99         |  |
| channelized STM1 interfaces                     |            |  |
| status information, displaying.....             | 1086       |  |
| channelized STM1 IQ interfaces                  |            |  |
| status information, displaying.....             | 1083       |  |
| channelized T1 IQ interfaces                    |            |  |
| status information, displaying.....             | 1101       |  |
| channelized T3 IQ interfaces                    |            |  |
| status information, displaying.....             | 1113       |  |
| CHAP.....                                       | 123, 126   |  |
| chap statement.....                             | 447        |  |
| usage guidelines.....                           | 123, 126   |  |
| chap-secret statement.....                      | 448        |  |
| ci                                              |            |  |
| physical part of interface name.....            | 27         |  |
| circuit cross-connect (CCC)                     |            |  |
| encapsulation                                   |            |  |
| VLAN-bundled dual-tag logical                   |            |  |
| interfaces.....                                 | 941        |  |
| VLAN-bundled single-tag logical                 |            |  |
| interfaces.....                                 | 932        |  |
| circuit-type statement                          |            |  |
| dynamic VLAN authentication.....                | 448        |  |
| Cisco HDLC encapsulation                        |            |  |
| encapsulation overhead.....                     | 101        |  |
| keepalives.....                                 | 121        |  |
| Layer 2 switching cross-connect.....            | 249        |  |
| cisco-interoperability statement.....           | 449        |  |
| classifier statement.....                       | 449        |  |
| clear (ospf   ospf3) database command.....      | 1764       |  |
| clear (ospf   ospf3) io-statistics command..... | 1767       |  |
| clear (ospf   ospf3) neighbor command.....      | 1768       |  |
| clear (ospf   ospf3) overload command.....      | 1770       |  |
| clear (ospf   ospf3) statistics command.....    | 1771       |  |
| clear amt tunnel command.....                   | 1450, 1451 |  |
| clear ancp neighbor command.....                | 1340       |  |
| clear ancp statistics command.....              | 1342       |  |
| clear ancp subscriber command.....              | 1344       |  |
| clear bfd adaptation command.....               | 1378       |  |
| clear bfd session command.....                  | 1379       |  |
| clear bgp damping command.....                  | 1392       |  |
| clear bgp neighbor command.....                 | 1393       |  |
| clear bgp table command.....                    | 1396       |  |
| clear bridge mac-table command.....             | 2100       |  |
| clear error bpdu command.....                   | 2101       |  |
| clear error mac-rewrite command.....            | 2102       |  |
| clear esis adjacency command.....               | 1438       |  |
| clear esis statistics command.....              | 1439       |  |
| clear firewall command.....                     | 2078       |  |
| clear igmp membership command.....              | 1452       |  |
| clear igmp snooping membership command.....     | 1455       |  |
| clear igmp snooping statistics command.....     | 1456       |  |
| clear igmp statistics command.....              | 1457       |  |
| clear ipv6 neighbors command.....               | 1670       |  |
| clear ipv6 router-advertisement command.....    | 1671       |  |
| clear isis adjacency command.....               | 1678       |  |
| clear isis database command.....                | 1680       |  |
| clear isis overload command.....                | 1682       |  |
| clear isis statistics command.....              | 1684       |  |
| clear lldp neighbor command.....                | 1732       |  |
| clear lldp statistics command.....              | 1733       |  |
| clear mld membership command.....               | 1459       |  |
| clear mld statistics command.....               | 1460       |  |
| clear msdp cache command.....                   | 1461       |  |
| clear msdp statistics command.....              | 1462       |  |
| clear multicast bandwidth-admission             |            |  |
| command.....                                    | 1463       |  |
| clear multicast forwarding-cache command.....   | 1465       |  |
| clear multicast scope command.....              | 1466       |  |
| clear multicast sessions command.....           | 1467       |  |
| clear multicast snooping statistics             |            |  |
| command.....                                    | 1468       |  |
| clear multicast statistics command.....         | 1469       |  |
| clear pim join command.....                     | 1470       |  |
| clear pim join-distribution command.....        | 1472       |  |
| clear pim register command.....                 | 1474       |  |
| clear pim statistics command.....               | 1480       |  |
| clear rip general-statistics command.....       | 2058       |  |
| clear rip statistics command.....               | 2059       |  |
| clear ripng general-statistics command.....     | 2068       |  |
| clear ripng statistics command.....             | 2069       |  |
| clear vpls mac-address command.....             | 2130       |  |
| clear vpls mac-table command.....               | 2131       |  |
| clear dont-fragment-bit statement.....          | 450        |  |
| clock rates.....                                | 301        |  |
| clock sources.....                              | 116, 452   |  |

- 
- clock-rate statement.....451
    - usage guidelines.....301
  - clocking modes.....301
  - clocking statement.....452
    - usage guidelines.....116
  - clocking-mode statement.....453
    - usage guidelines.....300
  - coc1
    - physical part of interface name.....27
  - coc12
    - physical part of interface name.....27
  - coc3
    - physical part of interface name.....27
  - coc48
    - physical part of interface name.....27
  - comments, in configuration statements.....xliv
  - communities
    - policy, routing.....454
  - community ASN, displaying routes.....1878
  - community name, displaying routes.....1880
  - community statement.....454
  - compatibility-mode statement.....457
  - compression.....173
  - compression statement
    - usage guidelines.....129, 131
  - compression-device statement.....459
  - connections
    - configuration statements.....376, 380
  - connections statement.....460
    - usage guidelines.....253
  - connectivity-fault management.....393, 394
  - connectivity-fault-management statement.....461
  - container interfaces.....8
  - container-devices statement.....463
    - device-count.....463
  - container-list statement.....463
  - container-options statement.....464
  - container-type statement.....464
  - continuity-check statement.....465
  - control leads
    - serial interfaces.....302
  - control-channel statement.....466
  - control-leads statement
    - usage guidelines.....302
  - control-polarity statement.....467
    - usage guidelines.....305
  - control-signal statement.....467
    - usage guidelines.....302
  - conventions
    - text and syntax.....xlili
  - copy-to-outer-ip-header statement.....468
  - core-dump statement.....468, 711
    - usage guidelines.....149
  - CoS
    - hierarchical scheduling.....573
  - cp
    - physical part of interface name.....27
  - crc-major-alarm-threshold statement.....469
  - crc-minor-alarm-threshold statement.....470
  - cstm1
    - physical part of interface name.....27
  - cstm16
    - physical part of interface name.....27
  - cstm4
    - physical part of interface name.....27
  - ct1
    - physical part of interface name.....27
  - ct3
    - physical part of interface name.....27
  - cts statement.....471
    - usage guidelines.....302
  - cts-polarity statement.....471
    - usage guidelines.....305
  - curly braces, in configuration statements.....xliv
  - customer support.....xliv
    - contacting JTAC.....xliv
  - cycle-time statement.....472
- ## D
- damping
    - interface transitions.....145
  - Damping field, contents.....958
  - damping parameters, BGP
    - clearing.....1392
    - displaying.....1434
  - damping routes, BGP
    - displaying.....1882
  - damping statement.....473
  - data circuit-terminating equipment *See* DCE
  - data terminal equipment *See* DTE
  - data-channel statement.....475
  - data-tlv-size statement.....476
  - dcd statement.....477
    - usage guidelines.....302
  - dcd-polarity statement.....477
    - usage guidelines.....305
  - DCE.....134, 478

|                                            |          |                                      |        |
|--------------------------------------------|----------|--------------------------------------|--------|
| dce statement.....                         | 478      | disabling                            |        |
| usage guidelines.....                      | 134      | keepalives.....                      | 121    |
| default router addresses.....              | 189      | logical interfaces.....              | 180    |
| default-actions statement.....             | 478      | physical interfaces.....             | 153    |
| default-chap-secret statement.....         | 479      | example configuration.....           | 154    |
| default-pap-password statement.....        | 479      | discard interface                    |        |
| delimiter statement                        |          | described.....                       | 269    |
| dynamic VLAN authentication.....           | 480      | status information, displaying.....  | 1115   |
| demux                                      |          | dlci statement.....                  | 496    |
| physical part of interface name.....       | 27       | do-not-fragment statement            |        |
| demux interfaces                           |          | tunnel.....                          | 497    |
| unnumbered.....                            | 196      | documentation                        |        |
| demux-destination statement.....           | 480      | comments on.....                     | xlv    |
| demux interfaces.....                      | 481      | domain-name statement                |        |
| demux-options statement.....               | 481      | dynamic VLAN authentication.....     | 497    |
| demux-source statement.....                | 483      | donor interface                      |        |
| demux interfaces.....                      | 482      | unnumbered Ethernet or demux.....    | 196    |
| demux0 statement.....                      | 484      | dot1x                                |        |
| dynamic IP demux interface.....            | 485      | configuration statements.....        | 377    |
| description statement.....                 | 486      | dot1x statement.....                 | 498    |
| usage guidelines.....                      | 102, 168 | authenticator.....                   | 498    |
| descriptors, interface.....                | 52       | authentication-profile-name.....     | 498    |
| Destination class field, contents.....     | 958      | interface.....                       | 498    |
| destination statement                      |          | <i>See also</i> maximum-requests     |        |
| tunnels.....                               | 488      | <i>See also</i> quiet-period         |        |
| usage guidelines.....                      | 187      | <i>See also</i> reauthentication     |        |
| destination-class-usage statement.....     | 489      | <i>See also</i> retries              |        |
| usage guidelines.....                      | 235      | <i>See also</i> server-timeout       |        |
| destination-profile statement.....         | 489      | <i>See also</i> supplicant           |        |
| usage guidelines.....                      | 187      | <i>See also</i> supplicant-timeout   |        |
| Device flags field, content.....           | 960      | <i>See also</i> transmit-period      |        |
| dfc                                        |          | down-count statement.....            | 499    |
| physical part of interface name.....       | 27       | Draft-rosen MVPNs                    |        |
| DHCP                                       |          | data MDT cache, displaying.....      | 1621   |
| accepting.....                             | 225      | MDT tunnels                          |        |
| dial-options statement.....                | 490      | displaying.....                      | 1623   |
| dialer statement.....                      | 491      | drop statement                       |        |
| dialer-options statement.....              | 492      | PPPoE service name tables.....       | 500    |
| direction statement.....                   | 493      | drop-timeout statement.....          | 500    |
| disable statement.....                     | 494      | ds                                   |        |
| link protection.....                       | 495      | physical part of interface name..... | 27     |
| logical interfaces                         |          | DS interfaces                        |        |
| usage guidelines.....                      | 180      | status information, displaying.....  | 1242   |
| physical interfaces                        |          | ds0-options statement.....           | 501    |
| usage guidelines.....                      | 153      | DS3 IQ interfaces                    |        |
| disable-mlppp-inner-ppp-pfc statement..... | 495      | MTU sizes.....                       | 96, 97 |
|                                            |          | DS3/E3 interfaces                    |        |
|                                            |          | MTU sizes.....                       | 99     |



- dsc
  - physical part of interface name.....27
- dsc interface.....269
  - described.....269
  - See also discard interface
- dsr statement.....502
  - usage guidelines.....302
- dsr-polarity statement.....502
  - usage guidelines.....305
- dte-options statement.....503
- DTR circuit
  - serial interfaces.....305
- dtr statement.....504
  - usage guidelines.....302
- dtr-circuit statement.....505
  - usage guidelines.....305
- dtr-polarity statement.....505
  - usage guidelines.....305
- dual-tag framing
  - VLAN ID list.....941
- dump-on-flow-control statement.....506
- DVMRP
  - groups, displaying.....1588
  - interfaces, displaying.....1492
  - neighbors, displaying.....1494
  - prefixes, displaying.....1496
  - prunes, displaying active.....1498
- dynamic overload bit, resetting for IS-IS.....1682
- dynamic PPPoE statements
  - pppoe-underlying-options.....783
- dynamic profiles statements
  - dynamic-profiles.....510
  - interfaces.....616
  - unnumbered-address.....918
- dynamic subscribers
  - interfaces statement.....616
  - pppoe-underlying-options statement.....783
- dynamic tunnel database, displaying.....2133
- dynamic VLAN authentication statements
  - authentication.....418
  - circuit-type.....448
  - delimiter.....480
  - domain-name.....497
  - interface-name.....608
  - mac-address.....667
  - option-82.....736
  - radius-realm.....802
  - user-prefix.....923
  - username-include.....924
- dynamic VLANs.....421
  - authenticating.....418
- dynamic-profile statement
  - MLPPP.....506
  - PPP.....506
  - PPPoE service name tables.....507
  - stacked VLAN ranges.....508
  - usage guidelines.....175
  - VLAN ranges.....509
- dynamic-profiles
  - interfaces statement.....616
  - dynamic IP demux.....616
- dynamic-profiles statement.....510
- E**
- E-LMI.....650
- e1
  - physical part of interface name.....27
- E1 interfaces
  - MTU sizes.....95, 96, 97
  - status information, displaying.....1242
- e1-options statement.....517
- e3
  - physical part of interface name.....27
- E3 interfaces
  - MTU sizes.....95, 96, 97
  - status information, displaying.....1267
- E3 IQ interfaces
  - MTU sizes.....96, 97
- e3-options statement.....518
- east-interface statement.....519
- egress-policer-overhead statement.....520
- em
  - physical part of interface name.....27
- em0.....14
  - management Ethernet interface.....4
  - management interface.....10
  - physical part of interface name.....27
- em1
  - internal Ethernet interface.....4
  - physical part of interface name.....27
- em2
  - physical part of interface name.....27
- Enabled field, contents.....958
- encapsulation
  - CCC.....249
  - Ethernet 802.3.....101
  - overheads.....101

|                                           |           |                                           |          |
|-------------------------------------------|-----------|-------------------------------------------|----------|
| encapsulation statement                   |           | Ethernet SNAP encapsulation               |          |
| container interface.....                  | 521       | encapsulation overhead.....               | 101      |
| Layer 2 switching cross-connect.....      | 249       | ethernet statement.....                   | 533      |
| logical interfaces.....                   | 522       | Ethernet TCC                              |          |
| physical interface.....                   | 526       | encapsulation                             |          |
| encoding                                  |           | encapsulation overhead.....               | 102      |
| byte.....                                 | 441       | Ethernet VLAN circuit                     |          |
| line.....                                 | 308       | VLAN ID list.....                         | 932      |
| encoding statement.....                   | 530       | ethernet-policer-profile statement.....   | 536      |
| usage guidelines.....                     | 308       | ethernet-ring statement.....              | 537      |
| enhanced subscriber management statements |           | ethernet-switch-profile statement.....    | 538      |
| traps.....                                | 901       | eui-64 statement.....                     | 539      |
| epd-threshold statement                   |           | usage guidelines.....                     | 187      |
| logical interface.....                    | 531       | evcs statement.....                       | 540      |
| physical interface.....                   | 532       | event (tracing flag).....                 | 311      |
| es                                        |           | event statement.....                      | 541      |
| physical part of interface name.....      | 27        | interface-status-tlv statement.....       | 612      |
| ES-IS                                     |           | port-status-tlv statement.....            | 780      |
| adjacencies                               |           | rdi statement.....                        | 805      |
| clearing.....                             | 1438      | event-thresholds                          |          |
| displaying.....                           | 1440      | frame-error statement.....                | 561      |
| interfaces, displaying.....               | 1442      | frame-period statement.....               | 562      |
| statistics                                |           | frame-period-summary statement.....       | 563      |
| clearing.....                             | 1439      | symbol-period statement.....              | 869      |
| displaying.....                           | 1444      | event-thresholds statement.....           | 541      |
| es-options statement.....                 | 532       | export route information, displaying..... | 1907     |
| et                                        |           | extended VLAN                             |          |
| physical part of interface name.....      | 27        | CCC                                       |          |
| Ethernet CCC encapsulation                |           | encapsulation overhead.....               | 102      |
| encapsulation overhead.....               | 101       | TCC                                       |          |
| Ethernet interfaces                       |           | encapsulation overhead.....               | 102      |
| dynamic VLANs.....                        | 421       | external clock sources.....               | 116, 452 |
| internal Ethernet interface.....          | 5         |                                           |          |
| mixed VLAN tagging.....                   | 555, 700  | <b>F</b>                                  |          |
| status information, displaying            |           | facility-override statement.....          | 543      |
| Fast Ethernet.....                        | 1120      | fail-filter statement.....                | 822      |
| Gigabit Ethernet.....                     | 967, 1137 | usage guidelines.....                     | 217      |
| internal.....                             | 1161      | failover-delay statement.....             | 543      |
| management.....                           | 1161      | family bridge                             |          |
| PTX Series.....                           | 1187      | VLAN ID list.....                         | 934      |
| unnumbered.....                           | 196       | VLAN IDs.....                             | 929      |
| preferred source address.....             | 785       | family descriptors.....                   | 52       |
| VLAN IDs.....                             | 930       | Family flags field, content.....          | 960      |
| VLAN tagging.....                         | 940       | family statement.....                     | 546      |
| Ethernet over ATM encapsulation           |           | dynamic profiles.....                     | 544      |
| encapsulation overhead.....               | 101       | usage guidelines.....                     | 186      |
| Ethernet Ring Protection                  |           | Fast Ethernet interfaces                  |          |
| configuration statements.....             | 381       | dynamic VLANs.....                        | 421      |
|                                           |           | link modes.....                           | 109      |

- MTU sizes.....95, 96, 97
- speed.....105
- status information, displaying.....1120
- VLAN IDs.....930
- VLAN tagging.....940
- fast-aps-switch statement.....542
- fastether-options statement.....550
- fcs statement.....551
- fe
  - physical part of interface name.....27
- feac-loop-respond statement.....552, 712
- filter statement.....553, 554
- Filters fields, contents.....959
- firewall
  - filter version
    - displaying.....2088
  - hierarchical-policer.....572
  - statistics
    - displaying.....2080
- firewall filters
  - log information, displaying.....2089
  - policed packets, displaying.....2096
  - statistics
    - clearing.....2078
    - displaying.....2092
- flags
  - address flags.....959
  - device flags.....960
  - family flags.....960
  - interface flags.....961
  - link flags.....962
  - logical interface flags.....962
- flexible-vlan-tagging statement.....555
- flooding
  - Layer 2 bridging, displaying.....2105
- flow-control statement.....556, 713
- flow-control-options statement.....557
- font conventions.....xlili
- force statement.....558
- forward-and-send-to-re statement.....558
- forward-only statement.....560
- forwarding table
  - interfaces, displaying.....1945
  - multicast information, displaying.....1564
  - multicast snooping information,
    - displaying.....1581
  - route entries, displaying.....1931
- forwarding-class statement
  - for ATM2 IQ scheduler maps.....559
- fragment-threshold statement.....560
- Frame Relay encapsulation
  - DCE.....134, 478
  - encapsulation overhead.....102
  - keepalives.....121
  - Layer 2 switching cross-connect.....250
- frame-error statement.....561
- frame-period statement.....562
- frame-period-summary statement.....563
- framing statement
  - 10-Gigabit Ethernet interfaces.....565
  - E1, E3, and T1 interfaces.....564
  - SONET and SDH interfaces.....566
- from statement.....771
- fxp
  - physical part of interface name.....27
- fxp0.....14
  - management Ethernet interface.....4
  - management interface.....10
  - physical part of interface name.....27
- fxp1
  - internal Ethernet interface.....4
  - physical part of interface name.....27
- fxp2
  - internal Ethernet interface.....4
  - physical part of interface name.....27
- G**
- ge
  - physical part of interface name.....27
- Gigabit Ethernet interfaces
  - demultiplexing interface information,
    - displaying.....1284
  - dynamic VLANs.....421
  - MTU sizes.....95, 96, 97, 98
  - status information, displaying.....967, 1137
  - VLAN IDs.....930, 935
  - VLAN tagging.....596, 929, 940
- Gigabit Ethernet IQ PIC
  - traffic and MAC statistics.....967, 1187
- Gigabit Ethernet uPIM interfaces
  - speed.....105
- gether-options statement.....567
- gr
  - physical part of interface name.....27
- gratuitous-arp-reply statement.....568, 714
- gre
  - physical part of interface name.....27

|                                                 |          |
|-------------------------------------------------|----------|
| groups                                          |          |
| BGP                                             |          |
| general information, displaying.....            | 1400     |
| traffic statistics, displaying.....             | 1407     |
| DVMRP, displaying.....                          | 1588     |
| IGMP membership, displaying.....                | 1500     |
| MLD                                             |          |
| clearing.....                                   | 1459     |
| displaying.....                                 | 1525     |
| PIM                                             |          |
| general information, displaying.....            | 1596     |
| usage information, displaying.....              | 1588     |
| guard-interval statement.....                   | 569      |
| <b>H</b>                                        |          |
| hardware-assisted-timestamping statement.....   | 570      |
| hello-timer statement.....                      | 571      |
| hidden routes, displaying.....                  | 1948     |
| hierarchical-policer statement.....             | 572      |
| hierarchical-scheduler statement                |          |
| for subscriber interfaces.....                  | 573      |
| high-plp-max-threshold statement.....           | 574      |
| high-plp-threshold statement.....               | 571, 575 |
| hold-interval statement                         |          |
| connectivity-fault management.....              | 575      |
| Ethernet ring protection switching.....         | 576      |
| hold-time statement                             |          |
| APS.....                                        | 576      |
| damping interface transitions                   |          |
| usage guidelines.....                           | 145      |
| Physical Interface.....                         | 577      |
| SONET/SDH Defect Triggers.....                  | 579      |
| host statement.....                             | 580      |
| hostnames                                       |          |
| IS-IS, displaying.....                          | 1709     |
| <b>I</b>                                        |          |
| iccp                                            |          |
| configuration statements.....                   | 377      |
| idle-cycle-flag statement.....                  | 582      |
| ieee802.1p statement.....                       | 583      |
| if-exceeding statement                          |          |
| hierarchical policer.....                       | 583      |
| IGMP                                            |          |
| group membership, displaying.....               | 1500     |
| interfaces, displaying.....                     | 1504     |
| PIM-to-IGMP message translation information,    |          |
| displaying.....                                 | 1560     |
| snooping (interface).....                       | 1508     |
| snooping (membership).....                      | 1513     |
| snooping (statistics).....                      | 1517     |
| statistics, displaying.....                     | 1522     |
| IGMP snooping                                   |          |
| enabling.....                                   | 584      |
| igmp-snooping statement.....                    | 584      |
| ignore statement.....                           | 585      |
| ignore-all statement.....                       | 586      |
| usage guidelines.....                           | 302      |
| ignore-l3-incompletes statement.....            | 586      |
| ilmi statement.....                             | 587      |
| ima-group-options statement.....                | 588      |
| ima-link-options statement.....                 | 590      |
| inactivity-timeout statement.....               | 590      |
| indication statement.....                       | 591      |
| usage guidelines.....                           | 302      |
| indication-polarity statement.....              | 591      |
| usage guidelines.....                           | 305      |
| ingress-policer-overhead statement.....         | 592      |
| ingress-rate-limit statement.....               | 593      |
| inner-tag-protocol-id statement.....            | 594      |
| inner-vlan-id statement.....                    | 595      |
| inner-vlan-id-range statement.....              | 596      |
| input option                                    |          |
| policers.....                                   | 203      |
| input statement.....                            | 596      |
| input-list statement.....                       | 597      |
| input-policer statement.....                    | 598      |
| input-priority-map statement.....               | 599      |
| input-three-color statement.....                | 600      |
| instance statement.....                         | 603      |
| interface addresses                             |          |
| logical interfaces.....                         | 187      |
| preferred interface addresses.....              | 189, 191 |
| primary interface addresses.....                | 189, 190 |
| Interface encapsulation on PTX Series Packet    |          |
| Transport Routers                               |          |
| configuring.....                                | 120, 172 |
| Interface flags field, content.....             | 961      |
| interface groups.....                           | 212      |
| interface learning information                  |          |
| Layer 2, displaying.....                        | 2125     |
| interface names                                 |          |
| conventions.....                                | 54, 55   |
| interface naming                                |          |
| chassis, routing matrix.....                    | 39       |
| routing matrix based on a TX Matrix Plus        |          |
| router.....                                     | 36       |
| routing matrix based on a TX Matrix router..... | 34       |

- 
- TX Matrix Plus router.....36
  - TX Matrix router.....34
  - interface range
    - expanding member and member range
      - statements.....88
  - interface ranges.....84
    - configuration.....84
    - inheritance range priorities.....91
    - inheriting common configuration.....91
    - under other hierarchies.....92
  - interface statement
    - CoS.....603
    - IEEE 802.1ag.....605
    - IEEE 802.1X.....604
    - IEEE 802.3ah.....606
  - interface transitions
    - damping.....145
  - interface-down statement.....478, 607
  - interface-name statement
    - dynamic VLAN authentication.....608
  - interface-range statement.....609
    - usage guidelines.....84
  - interface-set statement
    - Ethernet interfaces.....610
  - interface-shared-with statement.....611
  - interface-status-tlv statement.....612
  - interface-switch statement.....613
    - usage guidelines.....248
  - interface-type statement.....614
  - interfaces.....39
    - alias name.....409
    - clock sources.....116, 452
    - configuration statements.....356
    - container interfaces.....8
    - descriptive text.....486
    - descriptors.....52
    - disabling.....153, 180
    - display order in configurations.....55
    - interface-range.....609
    - mixed VLAN tagging.....555, 700
    - names.....27
    - permanent interfaces.....4, 5
    - services interfaces.....7
    - transient interfaces.....4, 5
    - unit statement.....908
  - interfaces statement.....615
    - dynamic profiles.....616
  - interfaces, displaying
    - in the forwarding table.....1945
  - interleave-fragments statement.....620
  - internal clock sources.....116, 452
  - internal Ethernet interface.....5
    - status information, displaying.....1161
  - Internet Protocol Control Protocol *See* IPCP
  - interval statement.....620
  - invalid routes, displaying.....1970
  - inverse-arp statement.....621
  - invert-data statement.....622
  - ip
    - physical part of interface name.....27
  - IP addresses
    - unnumbered interfaces.....195
  - IP IGMP snooping
    - membership
      - clearing.....1455
    - statistics
      - clearing.....1456
  - IP multicast
    - announced sessions, displaying.....1578
    - backup PE groups, displaying.....1547
    - bandwidth admission
      - clearing.....1463
    - flow map information, displaying.....1549
    - forwarding cache, clearing.....1465
    - forwarding table, displaying.....1564
    - forwarding-cache statistics
      - displaying.....1551
    - interface information, displaying.....1553
    - network information, displaying.....1555
    - next-hop table, displaying.....1557
    - PIM-to-IGMP message translation information,
      - displaying.....1560
    - PIM-to-MLD message translation information,
      - displaying.....1562
    - RPF calculations, displaying.....1570
    - SAP announcements, displaying.....1666
    - scope, clearing.....1466
    - scoped information, displaying.....1574
    - sessions, clearing.....1467
    - statistics
      - clearing.....1469
      - displaying.....1585
  - IP multicast snooping
    - forwarding table, displaying.....1581
    - statistics
      - clearing.....1468
      - displaying.....1576
  - ipc (tracing flag).....311

|                                      |          |                                                          |            |
|--------------------------------------|----------|----------------------------------------------------------|------------|
| IPCP.....                            | 193      | <b>J</b>                                                 |            |
| ipip                                 |          | join states, clearing PIM.....                           | 1470       |
| physical part of interface name..... | 27       | join states, redistributing.....                         | 1472       |
| ipsec-sa statement.....              | 623      | <b>K</b>                                                 |            |
| IPv4 Protocol family                 |          | keep-address-and-control statement.....                  | 624        |
| interface addresses.....             | 187      | usage guidelines.....                                    | 202        |
| on logical interfaces.....           | 186      | keepalives                                               |            |
| IPv6                                 |          | disabling.....                                           | 121        |
| neighbor cache information           |          | keepalives statement.....                                | 625        |
| clearing.....                        | 1670     | usage guidelines.....                                    | 121        |
| displaying.....                      | 1672     | key statement.....                                       | 626        |
| router advertisements                |          | <b>L</b>                                                 |            |
| clearing.....                        | 1671     | l2tp-interface-id statement.....                         | 626        |
| displaying.....                      | 1674     | label-switched interface See LSI                         |            |
| IPv6 Protocol family                 |          | Label-Switched Interface (LSI)                           |            |
| on logical interfaces.....           | 186      | status information, displaying.....                      | 1329       |
| IS-IS                                |          | Label-switched interface (LSI) traffic statistics field, |            |
| adjacency database entries, clearing |          | content.....                                             | 963        |
| all.....                             | 1678     | lacp statement.....                                      | 627        |
| authentication, displaying.....      | 1690     | 802.3ad.....                                             | 628        |
| backup coverage                      |          | Aggregated Ethernet.....                                 | 629        |
| displaying.....                      | 1692     | Layer 2 BPDU loop prevention                             |            |
| backup MPLS LSPs.....                | 1694     | clearing errors.....                                     | 2101       |
| backup paths                         |          | Layer 2 bridging                                         |            |
| SPF calculations.....                | 1696     | bridge domain, displaying.....                           | 2103       |
| dynamic overload bit, resetting..... | 1682     | flooding, displaying.....                                | 2105       |
| hostname database, displaying.....   | 1709     | interface learning information,                          |            |
| interfaces, displaying.....          | 1711     | displaying.....                                          | 2125       |
| link-state database entries          |          | learning information, displaying.....                    | 2120, 2122 |
| clearing.....                        | 1680     | learning properties, displaying.....                     | 2123       |
| displaying.....                      | 1702     | MAC address table, clearing.....                         | 2100       |
| neighbors, displaying.....           | 1686     | MAC address table, displaying.....                       | 2112       |
| routes, displaying.....              | 1719     | statistics, displaying.....                              | 2117       |
| SPF calculations, displaying.....    | 1723     | Layer 2 circuits                                         |            |
| traffic statistics                   |          | connections, displaying.....                             | 2140       |
| clearing.....                        | 1684     | redundant pseudowires.....                               | 2132       |
| displaying.....                      | 1728     | Layer 2 protocol tunneling                               |            |
| ISO Protocol family.....             | 186, 187 | clearing errors.....                                     | 2102       |
| iteration-count statement.....       | 623      | interface information, displaying.....                   | 2127       |
| iteration-period statement.....      | 624      | Layer 2 switching cross-connect                          |            |
| iv                                   |          | CCC connections.....                                     | 253        |
| physical part of interface name..... | 27       | CCC encapsulation.....                                   | 249        |
| ixgbe0                               |          | MPLS.....                                                | 253        |
| internal Ethernet interface.....     | 4        | router configuration.....                                | 248        |
| physical part of interface name..... | 27       |                                                          |            |
| ixgbe1                               |          |                                                          |            |
| internal Ethernet interface.....     | 4        |                                                          |            |
| physical part of interface name..... | 27       |                                                          |            |

- 
- Layer 2 VPNs
    - connections, displaying.....2148
    - VPLS connections, displaying.....2164
    - VPLS statistics, displaying.....2187
  - Layer 3 incomplete errors.....586
  - Layer 3 VPNs
    - dynamic tunnel database, displaying.....2133
    - PIM MDTs, displaying.....1617
  - layer2-policer statement.....631
  - lc
    - physical part of interface name.....27
  - LCC.....34
    - in a routing matrix based on a TX Matrix Plus router.....36
  - LCP
    - address and control field compression.....129
    - protocol field compression.....131, 173
  - lcp-max-conf-req statement.....632
  - lcp-restart-timer statement.....632
    - usage guidelines.....173
  - leaky bucket properties.....134, 135
  - learning information
    - Layer 2, displaying.....2120, 2122
  - learning properties
    - Layer 2, displaying.....2123
  - level statement.....633
  - line.....308
    - protocol.....296
  - line-card chassis See LCC
  - line-encoding statement.....634
  - line-protocol statement.....635
    - usage guidelines.....296
  - linear-red-profile statement.....636
  - linear-red-profiles statement.....637
  - Link flags field, content.....962
  - link modes.....109
  - link protection
    - disable statement.....495
    - non-revertive statement.....728
    - revertive statement.....817
  - link speed
    - Ethernet aggregation.....106
  - link-adjacency-loss statement.....637
  - link-discovery statement.....638
  - link-down statement.....638
  - link-event-rate statement.....639
  - link-fault management.....395
  - link-fault-management statement.....640
  - link-layer-overhead statement.....641
  - link-mode statement.....642
    - usage guidelines.....109
  - link-protection statement.....643
  - link-speed statement
    - usage guidelines.....106
  - linktrace statement.....647
  - LLDP
    - displaying.....1734
    - local information, displaying.....1737
    - neighbor
      - clearing.....1732
    - neighbors, displaying.....1740
    - remote global statistics, displaying.....1746
    - statistics
      - clearing.....1733
      - statistics, displaying.....1748
  - LMI packets See keepalives
  - lmi statement
    - Ethernet OAM.....650
    - Frame Relay keepalives.....648
  - lmi-type statement.....651
  - lo
    - physical part of interface name.....27
  - Local Management Interface packets See keepalives
  - local-name statement.....652
    - usage guidelines.....123, 126
  - local-password statement.....653
  - lockout statement.....653
  - log-prefix statement.....654
  - Logical interface flags field.....962
  - logical interface properties, statements for.....161
  - logical interface scheduling.....759
  - logical interface statements
    - family.....544
  - logical interfaces
    - clear loopback detected timer.....174
    - default router addresses.....189
    - descriptive text.....168
    - descriptors.....52
    - disabling.....180
    - interface addresses.....187, 189
    - interface bandwidth.....169
    - Layer 2 switching cross-connect.....248
    - multipoint connections.....173
    - point-to-point connections.....173
    - policers.....203
    - PPP restart timers.....173
    - preferred interface addresses.....189, 191

|                                                               |          |
|---------------------------------------------------------------|----------|
| primary interface addresses.....                              | 189, 190 |
| primary router addresses.....                                 | 189      |
| primary router interfaces.....                                | 190      |
| protocol families.....                                        | 186      |
| protocol MTU.....                                             | 201      |
| protocol redirect messages.....                               | 202      |
| SNMP notifications.....                                       | 180      |
| unit numbers.....                                             | 168      |
| unnumbered interfaces.....                                    | 195      |
| VLAN IDs.....                                                 | 930, 935 |
| VLAN-bundled                                                  |          |
| dual-tag.....                                                 | 941      |
| single-tag.....                                               | 932      |
| logical part of interface name.....                           | 33       |
| logical routers See logical systems                           |          |
| logical systems                                               |          |
| configuration statements.....                                 | 372      |
| interfaces.....                                               | 181      |
| logical-interface-fpc-redundancy statement                    |          |
| aggregated Ethernet.....                                      | 654      |
| logical-interface-policer statement.....                      | 655      |
| logical-systems statement.....                                | 656      |
| usage guidelines.....                                         | 181      |
| long-buildout statement.....                                  | 656, 716 |
| loop-timing statement.....                                    | 657      |
| loopback capability.....                                      | 306      |
| loopback statement                                            |          |
| ADSL, DSO, E1/E3, SONET/SDH, SHDSL, and T1/T3.....            | 658      |
| Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet..... | 660, 717 |
| serial.....                                                   | 661      |
| serial interfaces                                             |          |
| usage guidelines.....                                         | 306      |
| loopback testing.....                                         | 317      |
| loopback-clear-timer statement.....                           | 662      |
| usage guidelines.....                                         | 174      |
| loss-priority statement.....                                  | 662      |
| loss-threshold statement.....                                 | 663      |
| low-plp-max-threshold statement.....                          | 663      |
| low-plp-threshold statement.....                              | 664      |
| lowest-priority-defect statement.....                         | 665      |
| ls                                                            |          |
| physical part of interface name.....                          | 27       |
| lsi                                                           |          |
| physical part of interface name.....                          | 27       |
| LSI                                                           |          |
| traffic statistics.....                                       | 963      |
| lsq-failure-options statement.....                            | 666      |
| <b>M</b>                                                      |          |
| MAC address table                                             |          |
| Layer 2, clearing address information.....                    | 2100     |
| Layer 2, displaying.....                                      | 2112     |
| mac statement.....                                            | 666      |
| mac-address statement                                         |          |
| Accept Source Mac.....                                        | 667      |
| dynamic VLAN authentication.....                              | 667      |
| mac-learn-enable statement.....                               | 668, 718 |
| mac-validate statement.....                                   | 669      |
| maintenance-association statement.....                        | 670      |
| maintenance-domain statement.....                             | 671      |
| mip-half-function.....                                        | 681      |
| virtual-switch.....                                           | 928      |
| management Ethernet interface                                 |          |
| interface speed.....                                          | 105      |
| link modes.....                                               | 109      |
| overview.....                                                 | 5        |
| speed.....                                                    | 105      |
| management interface.....                                     | 14       |
| em0.....                                                      | 10, 14   |
| fxp0.....                                                     | 10, 14   |
| manuals                                                       |          |
| comments on.....                                              | xlv      |
| martians, displaying.....                                     | 1970     |
| master-only statement.....                                    | 672      |
| maximum transmission unit See MTU                             |          |
| maximum-contexts statement.....                               | 673      |
| maximum-requests statement.....                               | 673      |
| maximum-vcs statement.....                                    | 674      |
| mc-ae statement.....                                          | 675      |
| MDT                                                           |          |
| displaying information.....                                   | 1617     |
| MDT join TLV                                                  |          |
| displaying advertisements received.....                       | 1621     |
| media (tracing flag).....                                     | 311      |
| media MTUs.....                                               | 93       |
| See also MTU                                                  |          |
| media-specific interface information                          |          |
| displaying.....                                               | 1332     |
| member interfaces                                             |          |
| expanding.....                                                | 90       |
| inheritance.....                                              | 89       |
| member statement                                              |          |
| usage guidelines.....                                         | 84       |
| member-interface-speed statement.....                         | 677      |
| member-interface-type statement.....                          | 678      |
| member-range statement                                        |          |
| usage guidelines.....                                         | 84       |



- 
- mep statement.....679
  - minimum-links statement.....680
  - mip-half-function statement.....681
  - mixed VLAN tagging.....555, 700
  - ml
    - physical part of interface name.....27
  - MLD
    - group membership
      - clearing.....1459
      - displaying.....1525
    - interfaces, displaying.....1529
    - PIM-to-MLD message translation information, displaying.....1562
    - statistics
      - clearing.....1460
      - displaying.....1533
  - mlfr-uni-nni-bundle-options statement.....682
  - MLPPP
    - dynamic profile attachment.....506
  - MLPPP statements
    - dynamic-profile.....506
  - mo
    - physical part of interface name.....27
  - mode statement.....683
    - usage guidelines.....221
  - monitor-session statement.....684
    - usage guidelines.....132, 313
  - monitoring services interfaces
    - physical interface properties.....149
  - MPLS
    - labels, displaying routes.....1963
    - Layer 2 switching cross-connect.....253
    - protocol family.....186, 187
  - mpls statement.....684
  - ms
    - physical part of interface name.....27
  - MSDP
    - cache entries, clearing.....1461
    - general information, displaying.....1536
    - message source information, displaying.....1538
    - peer statistics
      - clearing.....1462
      - displaying.....1543
    - source-active cache, displaying.....1540
  - mt
    - physical part of interface name.....27
  - MTU
    - physical interfaces.....93
  - mtu statement.....685
    - logical interfaces
      - usage guidelines.....201
    - usage guidelines.....93
  - mtun
    - physical part of interface name.....27
  - MTUs
    - logical interfaces.....201
    - protocol MTUs.....201
  - multi-chassis-protection
    - peer statement.....757
  - multi-chassis-protection statement.....689
  - Multi-Rate Ethernet interfaces
    - MTU sizes.....98
  - multicast distribution trees *See* MDT
  - multicast VPNs
    - customer multicast routes, displaying.....2154
    - neighbors, displaying.....2160
    - routing instances, displaying.....2157
  - multicast-dlci statement.....690
  - multicast-only statement.....690
  - multicast-statistics
    - aggregated Ethernet interfaces.....691
    - aggregated SONET interfaces.....691
  - multicast-vci statement.....692
  - multilink-max-classes statement.....693
  - multipoint connections.....173
  - multipoint statement.....693
    - usage guidelines.....173
  - multipoint-destination statement.....694
  - Multiprotocol Label Switching *See* MPLS
  - multiservice-options statement.....695
    - usage guidelines.....149
  - MVPN.....1621, 1623
    - See also* Draft-Rosen MVPNs
  - MVRP
    - configuration
      - show.....1752, 1754, 1757, 1758
    - dynamic-vlan-memberships
      - show.....1756
    - statistics
      - show.....1760
- ## N
- n391 statement.....696
  - n392 statement.....697
  - n393 statement.....698
  - name-format statement.....699

|                                              |          |                                         |          |
|----------------------------------------------|----------|-----------------------------------------|----------|
| names.....                                   | 39       | no-traps statement.....                 | 901      |
| of interfaces.....                           | 27       | usage guidelines.....                   | 150, 180 |
| native-vlan-id statement.....                | 700      | no-unframed statement.....              | 727, 907 |
| nbp-max-conf-req statement.....              | 701      | no-z0-increment statement.....          | 727, 955 |
| nbp-restart-timer statement.....             | 702      | non-revertive statement.....            | 728      |
| usage guidelines.....                        | 173      | nonconfigurable interfaces.....         | 4        |
| negotiate-address statement.....             | 704      |                                         |          |
| negotiation-options                          |          | <b>O</b>                                |          |
| allow-remote-loopback statement.....         | 410      | OAM                                     |          |
| no-allow-link-events statement.....          | 705      | configuration statements.....           | 378      |
| negotiation-options statement.....           | 704      | OAM cells See keepalives                |          |
| neighbor                                     |          | oam statement.....                      | 729      |
| ANCP.....                                    | 1340     | oam-liveness statement.....             | 732      |
| LLDP.....                                    | 1732     | oam-period statement.....               | 733      |
| neighbor statement.....                      | 705      | oc-slice statement.....                 | 734      |
| next hops                                    |          | oc12                                    |          |
| multicast entries, displaying.....           | 1557     | physical part of interface name.....    | 27       |
| resolution database, displaying.....         | 2010     | oc3                                     |          |
| routes sent to, displaying.....              | 1973     | physical part of interface name.....    | 27       |
| no unidirectional statement.....             | 907      | oc48                                    |          |
| no-aggregate-delegate-processing             |          | physical part of interface name.....    | 27       |
| statement.....                               | 706      | Open Shortest Path First See OSPF       |          |
| no-allow-link-events statement.....          | 705      | open-timeout statement.....             | 734      |
| no-asynchronous-notification statement.....  | 414, 707 | optics-options statement.....           | 735      |
| no-auto-mdix statement.....                  | 708      | alarm.....                              | 408      |
| no-cbit-parity statement.....                | 444, 710 | warning.....                            | 948      |
| no-core-dump statement.....                  | 468, 711 | option-82 statement                     |          |
| usage guidelines.....                        | 149      | dynamic VLAN authentication.....        | 736      |
| no-feac-loop-respond statement.....          | 552, 712 | OSPF                                    |          |
| no-flow-control statement.....               | 556, 713 | backup coverage                         |          |
| no-gratuitous-arp-reply statement.....       | 568, 714 | displaying.....                         | 1773     |
| no-gratuitous-arp-request statement.....     | 714      | backup MPLS LSPs                        |          |
| no-keepalives statement.....                 | 715      | displaying.....                         | 1776     |
| usage guidelines.....                        | 121      | backup neighbor paths.....              | 1778     |
| no-long-buildout statement.....              | 656, 716 | backup paths                            |          |
| no-loop-timing statement.....                | 657      | SPF calculations.....                   | 1780     |
| no-loopback statement.....                   | 660, 717 | context identifier, displaying.....     | 1787     |
| no-mac-learn-enable statement.....           | 668, 718 | interfaces, displaying.....             | 1808     |
| no-partition statement.....                  | 719      | link-state database entries, displaying |          |
| no-payload-scrambler statement.....          | 721, 754 | version 2.....                          | 1789     |
| no-redirects statement.....                  | 723      | version 3.....                          | 1797     |
| usage guidelines.....                        | 202      | neighbors                               |          |
| no-source-filtering statement.....           | 724, 854 | clearing connections.....               | 1768     |
| no-syslog statement                          |          | displaying.....                         | 1819     |
| usage guidelines.....                        | 149      | overview                                |          |
| no-termination-request statement.....        | 725      | displaying.....                         | 1825     |
| no-translate-discard-eligible statement..... | 726, 895 | routing table entries, displaying.....  | 1830     |
| no-translate-fecn-and-beecn statement.....   | 726, 896 | SPF calculations, displaying.....       | 1816     |

- statistics, general
    - clearing.....1771
    - displaying.....1836
  - statistics, I/O
    - clearing.....1767
    - displaying.....1814
- otn-options statement.....737
- output option
  - policers.....203
- output statement.....738
- output-list statement.....739
- output-policer statement.....740
- output-priority-map statement.....741
- output-three-color statement.....742
- output-vlan-map statement
  - Aggregated Ethernet.....743
  - Gigabit Ethernet IQ.....744
- overflow statement
  - configuring.....135
  - receive bucket.....744
  - transmit bucket.....745
- overload bit, resetting for IS-IS.....1682
- override statement
  - stacked VLAN ranges.....745
  - VLAN ranges.....745
- P**
  - pado-advertise statement.....746
  - paired-group statement.....746
  - pap statement.....747
  - pap-password statement.....748
  - parentheses, in syntax descriptions.....xliv
  - partition statement.....749
  - passive statement
    - CHAP.....750
    - PAP.....750
    - usage guidelines.....123, 126
  - passive-monitor-mode statement.....751
  - password statement
    - stacked vlan ranges.....752
    - vlan ranges.....752
  - path-database-size statement.....752
  - path-trace statement.....753
  - payload-scrambler statement.....721, 754
  - payload-size statement.....755
  - pd
    - physical part of interface name.....27
  - pdu-interval statement.....755
  - pdu-threshold statement.....756
- pe
  - physical part of interface name.....27
- peer statement.....757
- peer-unit statement.....758
- per-unit scheduling.....759
- per-unit-scheduler statement.....759
- performance-monitoring statement.....761
- periodic statement.....762
- permanent interfaces.....4, 5
- pfc statement.....762
  - usage guidelines.....131
- physical interfaces
  - byte encoding.....441
  - C-bit parity mode.....444, 710
  - clock rates.....301
  - clock sources.....116, 452
  - clocking mode.....301
  - DCE.....134, 478
  - descriptive text.....102, 486
  - descriptors.....52
  - disabling.....153
  - DTR circuit.....305
  - dynamic VLANs.....421
  - keepalives.....121
  - leaky bucket properties.....134, 135
  - line encoding.....308
  - line protocol.....296
  - link modes.....109
  - loopback capability
    - serial interfaces.....306
  - meaningful alias name.....409
  - media MTU size.....93
  - mixed VLAN tagging.....555, 700
  - PPP CHAP.....123, 126
  - signal polarity.....305
  - SNMP notifications.....150
  - speed.....105
  - statements.....68
  - transitions, damping.....145
  - unidirectional mode
    - unidirectional link mode.....137, 138
  - VLAN tagging.....940
- physical part of interface name.....27
- pic-type statement.....763
- PIM
  - bootstrap routers, displaying.....1591
  - groups
    - general information, displaying.....1596
    - usage information, displaying.....1588

|                                              |          |                                            |          |
|----------------------------------------------|----------|--------------------------------------------|----------|
| interfaces                                   |          | logical interfaces.....                    | 203      |
| displaying.....                              | 1593     | output option.....                         | 203      |
| join states, clearing.....                   | 1470     | policers, displaying.....                  | 2096     |
| MDTs, displaying.....                        | 1617     | policy, routing                            |          |
| neighbors, displaying.....                   | 1625     | communities.....                           | 454      |
| PIM-to-IGMP message translation information, |          | policy-statement statement.....            | 771      |
| displaying.....                              | 1560     | pop statement                              |          |
| PIM-to-MLD message translation information,  |          | Gigabit Ethernet IQ interfaces.....        | 775      |
| displaying.....                              | 1562     | pop-all-labels statement.....              | 776      |
| prune states, clearing.....                  | 1470     | pop-pop statement                          |          |
| redistributing join states.....              | 1472     | Gigabit Ethernet IQ interfaces.....        | 777      |
| register                                     |          | pop-swap statement                         |          |
| clearing.....                                | 1474     | Gigabit Ethernet IQ interfaces.....        | 778      |
| RPF, displaying source state.....            | 1653     | port statement                             |          |
| RPs                                          |          | voice services.....                        | 779      |
| displaying.....                              | 1629     | port-priority statement                    |          |
| statistics                                   |          | LACP.....                                  | 779      |
| clearing.....                                | 1480     | port-status-tlv statement.....             | 780      |
| displaying.....                              | 1656     | post-service-filter statement.....         | 780      |
| pimd                                         |          | PPP                                        |          |
| physical part of interface name.....         | 27       | address and control field compression..... | 129      |
| pime                                         |          | dynamic profile attachment.....            | 506      |
| physical part of interface name.....         | 27       | dynamic-profile.....                       | 175      |
| plp-to-clp statement.....                    | 763      | PPP clear loopback detected timer.....     | 174      |
| plp1 statement.....                          | 764      | protocol field compression.....            | 131      |
| point-to-point connections                   |          | restart timer.....                         | 173      |
| logical interfaces.....                      | 173      | PPP statements                             |          |
| Point-to-Point Protocol encapsulation        |          | dynamic-profile.....                       | 506      |
| encapsulation overhead.....                  | 102      | ppp-options statement.....                 | 781      |
| keepalives.....                              | 121      | lcp-max-conf-req.....                      | 632      |
| PPP CHAP.....                                | 123, 126 | ncp-max-conf-req.....                      | 701      |
| point-to-point statement.....                | 765      | usage guidelines.....                      | 123, 126 |
| usage guidelines.....                        | 173      | PPPD processes, trace operations.....      | 133, 314 |
| policer                                      |          | PPPoE                                      |          |
| interface.....                               | 769      | interfaces, displaying.....                | 1177     |
| Policer field, content.....                  | 964      | pppoe-options statement.....               | 782      |
| policer statement                            |          | pppoe-underlying-options statement         |          |
| CFM firewall.....                            | 765      | static and dynamic PPPoE.....              | 783      |
| CFM global level.....                        | 766      | preferred interface addresses.....         | 189, 191 |
| CFM session level.....                       | 767      | preferred statement.....                   | 784      |
| CoS.....                                     | 768      | usage guidelines.....                      | 191      |
| interface MAC.....                           | 770      | preferred-source-address statement.....    | 785      |
| usage guidelines.....                        | 203      | usage guidelines.....                      | 197      |
| policers                                     |          | premium                                    |          |
| applying.....                                | 203      | policer.....                               | 787      |
| arp option.....                              | 203      | premium statement                          |          |
| burst-size-limit                             |          | hierarchical policer.....                  | 786      |
| statement.....                               | 203      | output priority map.....                   | 787      |
| input option.....                            | 203      | preserve-interface statement.....          | 788      |

- 
- primary interface addresses.....189, 190
  - primary router addresses.....189
  - primary router interfaces.....190
  - primary statement
    - address for interface
      - usage guidelines.....190
    - address on interface.....789
    - AS PIC or Multiservices PIC interfaces.....789
    - interface for router
      - usage guidelines.....190
  - priority
    - schedulers.....790
  - priority statement
    - OAM connectivity-fault management.....790
  - promiscuous-mode statement.....791
  - protect-circuit statement.....792
  - protection-group
    - configuration statements.....381
  - protection-group statement.....793
  - protocol families
    - logical interfaces.....186
    - protocol MTUs.....201
    - unnumbered interfaces.....195
  - protocol field compression.....131
  - Protocol field, content.....964
  - protocol MTUs.....93
    - logical interfaces.....201
    - See also MTU
  - protocol redirect messages.....202
  - protocol-down statement.....795
  - protocols
    - line.....296
  - protocols connections
    - configuration statements.....376, 380
  - protocols dot1x
    - configuration statements.....377
  - protocols Ethernet Ring Protection
    - configuration statements.....381
  - protocols iccp
    - configuration statements.....377
  - protocols OAM
    - configuration statements.....378
  - protocols statement.....795
  - protocols VRRP
    - configuration statements.....378
  - proxy statement.....796
  - proxy-arp statement.....797
  - prune states, clearing PIM.....1470
  - prunes, DVMRP, displaying.....1498
  - pseudowires
    - mixed VLAN tagging.....555
    - redundant switchover.....2132
  - PTX Series interfaces
    - status information, displaying.....1187
  - push statement
    - Gigabit Ethernet IQ interfaces.....798
  - push-push statement
    - Gigabit Ethernet IQ interfaces.....799
- ## Q
- queue-depth statement.....800
  - queue-length statement.....801
  - queues statement.....801
  - quiet-period statement.....802
- ## R
- radius-realm statement
    - dynamic VLAN authentication.....802
  - ranges statement
    - stacked VLAN.....803
    - VLAN.....803
  - rate statement.....804
    - configuring.....135
  - rdi statement.....805
  - reassemble-packets statement.....805
  - reauthentication statement.....806
  - receive (tracing flag modifier).....311
  - receive-bucket statement.....807
    - configuring.....135
  - receive-options-packets statement.....807
  - receive-ttl-exceeded statement.....808
  - red-differential-delay statement.....808
  - redirect messages.....202
  - redundancy mechanisms for Virtual Chassis
    - module.....654
  - redundancy-options statement.....809
  - redundant pseudowires, switchover.....2132
  - regular expressions
    - AS paths, displaying matching routes.....1870
    - IP multicast scope
      - clearing.....1466
    - IP multicast sessions
      - clearing.....1467
      - displaying.....1578
    - target communities, displaying.....1910
  - remote statement.....810
  - remote-loopback statement.....810
  - remote-loopback-respond statement.....811

|                                           |      |                                       |        |
|-------------------------------------------|------|---------------------------------------|--------|
| remote-mep statement.....                 | 812  | routes, displaying                    |        |
| remove-when-no-subscribers statement..... | 812  | active.....                           | 1852   |
| rendezvous points See RPs                 |      | active path.....                      | 1858   |
| replication                               |      | advertising protocol.....             | 1863   |
| of BGP configuration.....                 | 1426 | all.....                              | 1868   |
| request ancp oam interface command.....   | 1346 | AS paths                              |        |
| request ancp oam neighbor command.....    | 1347 | distribution of.....                  | 1843   |
| request l2circuit-switchover command..... | 2132 | domain information.....               | 1847   |
| request pim multicast-tunnel rebalance    |      | regular expressions, matching.....    | 1870   |
| command.....                              | 1483 | summary of.....                       | 1850   |
| request statement.....                    | 813  | best.....                             | 1872   |
| required-depth statement.....             | 814  | brief information.....                | 1875   |
| retries statement.....                    | 816  | CCC.....                              | 1877   |
| reverse path forwarding See RPF           |      | community ASN.....                    | 1878   |
| revert-time statement.....                | 816  | community name.....                   | 1880   |
| revertive statement.....                  | 817  | damping, BGP.....                     | 1882   |
| rfc-2615 statement.....                   | 817  | detailed information.....             | 1887   |
| ring-protection-link-end statement.....   | 818  | extensive information.....            | 1912   |
| ring-protection-link-owner statement..... | 818  | flow validation.....                  | 1929   |
| RIP                                       |      | hidden.....                           | 1948   |
| general statistics                        |      | in a prefix range.....                | 1997   |
| clearing.....                             | 2058 | in a specific routing table.....      | 2026   |
| displaying.....                           | 2060 | in the forwarding table.....          | 1931   |
| neighbors                                 |      | inactive path.....                    | 1951   |
| displaying.....                           | 2062 | inactive prefix.....                  | 1954   |
| statistics                                |      | instances.....                        | 1956   |
| clearing.....                             | 2059 | learned from a specific address.....  | 2016   |
| displaying.....                           | 2064 | learned from a specific protocol..... | 1987   |
| RIPng                                     |      | learned from snooping.....            | 2013   |
| general statistics                        |      | LSP.....                              | 1966   |
| clearing.....                             | 2068 | martian.....                          | 1970   |
| displaying.....                           | 2070 | matching the specified address.....   | 1905   |
| neighbors                                 |      | MPLS labels.....                      | 1963   |
| displaying.....                           | 2072 | next-hop resolution.....              | 2010   |
| statistics                                |      | not associated with a community.....  | 1979   |
| clearing.....                             | 2069 | policy-based route export.....        | 1907   |
| displaying.....                           | 2074 | received through a neighbor.....      | 2001   |
| rlsq                                      |      | sent to a specific interface.....     | 1982   |
| physical part of interface name.....      | 27   | summary statistics.....               | 2022   |
| rms                                       |      | terse.....                            | 2054   |
| physical part of interface name.....      | 27   | routing matrix                        |        |
| route advertisements, displaying.....     | 1863 | chassis, interface naming.....        | 39     |
| route, displaying                         |      | interface naming.....                 | 34, 36 |
| next-hop.....                             | 1973 | routing-instance statement.....       | 819    |
| router advertisements                     |      | PPPoE service name tables.....        | 820    |
| IPv6                                      |      |                                       |        |
| clearing.....                             | 1671 |                                       |        |
| displaying.....                           | 1674 |                                       |        |

- 
- RPF
    - calculations, displaying.....1570
    - PIM source state, displaying.....1653
  - RPF Failures field, content.....965
  - rpf-check statement.....821, 822
    - usage guidelines.....217
  - rpf-loose-mode-discard statement.....823
  - RPs
    - displaying.....1629
  - rsp
    - physical part of interface name.....27
  - rtp statement.....823
  - rts statement.....824
    - usage guidelines.....302
  - rts-polarity statement.....824
    - usage guidelines.....305
  - rtvbr statement.....825
  - S**
    - sa-multicast statement.....827
    - sampling statement.....828
    - SAP session announcements, displaying.....1666
    - satop-options
      - payload-size.....755
    - satop-options statement.....829
    - SCC.....34
    - scheduler-maps statement
      - for ATM2 IQ interfaces.....831
    - schedulers statement.....831
    - SDH Interface Speed
      - configuration.....108
    - SDH interfaces
      - MTU sizes.....95, 96, 97
    - se
      - physical part of interface name.....27
    - secondary statement.....832
    - send (tracing flag modifier).....311
    - send-critical-event statement.....832
    - separators, in interface names.....33
    - serial interfaces
      - clock rates.....301
      - clocking mode.....300, 301
      - control leads.....302
      - correcting phase shift.....301
      - default settings.....296, 297
      - DTR circuit.....305
      - invalid statements.....298
      - line encoding.....308
      - line protocol.....296
      - loopback capability.....306
      - signal polarity.....305
      - status information, displaying.....1229
    - serial-options statement.....833
    - server statement.....834
    - server-timeout statement.....834
    - service statement
      - logical interfaces.....835
      - PPPoE.....836
    - service-domain statement.....837
    - service-filter statement.....838
    - service-name-table statement
      - PPPoE underlying interface.....839
    - service-name-tables statement
      - PPPoE.....840
    - service-set statement.....841
    - services interfaces.....7
    - services statement.....842
    - services-options statement.....843
    - Session Announcement Protocol *See* SAP
    - SFC.....36
    - shaping statement.....844
    - shared-interface statement.....830
    - short-name-format statement.....845
    - short-sequence statement.....846
    - shortest path first.....1723
    - show (ospf | ospf3) backup coverage
      - command.....1773
    - show (ospf | ospf3) backup lsp.....1776
    - show (ospf | ospf3) backup neighbor.....1778
    - show (ospf | ospf3) backup spf.....1780
    - show (ospf | ospf3) interface command.....1808
    - show (ospf | ospf3) io-statistics command.....1814
    - show (ospf | ospf3) log command.....1816
    - show (ospf | ospf3) neighbor command.....1819
    - show (ospf | ospf3) overview command.....1825
    - show (ospf | ospf3) route command.....1830
    - show (ospf | ospf3) statistics command.....1836
    - show amt statistics command.....1484
    - show amt summary command.....1487
    - show amt tunnel command.....1489
    - show ancp cos command.....1348
    - show ancp neighbor command.....1353
    - show ancp statistics command.....1361
    - show ancp subscriber command.....1366
    - show ancp summary command.....1371
    - show ancp summary neighbor command.....1373
    - show ancp summary subscriber command.....1375
    - show as-path command.....1843



|                                                                                                                         |                        |
|-------------------------------------------------------------------------------------------------------------------------|------------------------|
| show as-path domain command.....                                                                                        | 1847                   |
| show as-path summary command.....                                                                                       | 1850                   |
| show bfd session command.....                                                                                           | 1380                   |
| show bgp bmp command.....                                                                                               | 1398                   |
| show bgp group command.....                                                                                             | 1400                   |
| show bgp group traffic-statistics command.....                                                                          | 1407                   |
| show bgp neighbor command.....                                                                                          | 1409                   |
| show bgp replication command.....                                                                                       | 1426                   |
| show bgp summary command.....                                                                                           | 1428                   |
| show bridge domain command.....                                                                                         | 2103                   |
| show bridge flood command.....                                                                                          | 2105                   |
| show bridge mac-table command.....                                                                                      | 2112                   |
| show bridge statistics command.....                                                                                     | 2117                   |
| show command.....                                                                                                       | 1752, 1754, 1757, 1758 |
| show dvmp interfaces command.....                                                                                       | 1492                   |
| show dvmp neighbors command.....                                                                                        | 1494                   |
| show dvmp prefix command.....                                                                                           | 1496                   |
| show dvmp prunes command.....                                                                                           | 1498                   |
| show dynamic-tunnels database command.....                                                                              | 2133                   |
| show esis adjacency command.....                                                                                        | 1440                   |
| show esis interface command.....                                                                                        | 1442                   |
| show esis statistics command.....                                                                                       | 1444                   |
| show firewall command.....                                                                                              | 2080                   |
| show firewall filter version command.....                                                                               | 2088                   |
| show firewall log command.....                                                                                          | 2089                   |
| show firewall prefix-action-stats command.....                                                                          | 2092                   |
| show firewall templates-in-use command.....                                                                             | 2094                   |
| show igmp group command.....                                                                                            | 1500                   |
| show igmp interface command.....                                                                                        | 1504                   |
| show igmp snooping interface command.....                                                                               | 1508                   |
| show igmp snooping membership command.....                                                                              | 1513                   |
| show igmp snooping statistics command.....                                                                              | 1517                   |
| show igmp statistics command.....                                                                                       | 1522                   |
| show interfaces (10-Gigabit Ethernet)<br>command.....                                                                   | 967                    |
| show interfaces (ATM) command.....                                                                                      | 992                    |
| show interfaces (Channelized DS3-to-DS0)<br>command.....                                                                | 1027                   |
| show interfaces (Channelized DS3-to-DS1)<br>command.....                                                                | 1038                   |
| show interfaces (Channelized E1 IQ)<br>command.....                                                                     | 1041                   |
| show interfaces (Channelized E1) command.....                                                                           | 1045                   |
| show interfaces (Channelized OC12 IQ)<br>command.....                                                                   | 1056                   |
| show interfaces (Channelized OC12)<br>command.....                                                                      | 1060                   |
| show interfaces (Channelized OC3 IQ and IQE)<br>command.....                                                            | 1064                   |
| show interfaces (Channelized STM1 IQ)<br>command.....                                                                   | 1083                   |
| show interfaces (Channelized STM1)<br>command.....                                                                      | 1086                   |
| show interfaces (Channelized T1 IQ)<br>command.....                                                                     | 1101                   |
| show interfaces (Channelized T3 IQ)<br>command.....                                                                     | 1113                   |
| show interfaces (discard) command.....                                                                                  | 1115                   |
| show interfaces (Fast Ethernet) command.....                                                                            | 1120                   |
| show interfaces (Gigabit Ethernet) command.....                                                                         | 1137                   |
| show interfaces (M Series, MX Series, T Series<br>Routers, PTX Series Management and Internal<br>Ethernet) command..... | 1161                   |
| show interfaces (PPPoE) command.....                                                                                    | 1177                   |
| show interfaces (PTX Series Packet Transport<br>Routers) command.....                                                   | 1187                   |
| show interfaces (Serial) command.....                                                                                   | 1229                   |
| show interfaces (SONET/SDH) command.....                                                                                | 1201                   |
| show interfaces (T1, E1, or DS) command.....                                                                            | 1242                   |
| show interfaces (T3 or E3) command.....                                                                                 | 1267                   |
| show interfaces demux0 (Demux Interfaces)<br>command.....                                                               | 1284                   |
| show interfaces extensive command.....                                                                                  | 1293                   |
| show interfaces lsi (Label-Switched Interface)<br>command.....                                                          | 1329                   |
| show interfaces media command.....                                                                                      | 1332                   |
| show interfaces terse command.....                                                                                      | 1335                   |
| show ipv6 neighbors command.....                                                                                        | 1672                   |
| show ipv6 router-advertisement command.....                                                                             | 1674                   |
| show isis adjacency command.....                                                                                        | 1686                   |
| show isis authentication command.....                                                                                   | 1690                   |
| show isis backup coverage.....                                                                                          | 1692                   |
| show isis backup spf results.....                                                                                       | 1696                   |
| show isis context-identifier command.....                                                                               | 1700                   |
| show isis database command.....                                                                                         | 1702                   |
| show isis hostname command.....                                                                                         | 1709                   |
| show isis interface command.....                                                                                        | 1711                   |
| show isis overview command.....                                                                                         | 1715                   |
| show isis route command.....                                                                                            | 1719                   |
| show isis spf command.....                                                                                              | 1723                   |
| show isis statistics command.....                                                                                       | 1728                   |
| show isis-backup label-switched-path<br>command.....                                                                    | 1694                   |
| show l2-learning global-information<br>command.....                                                                     | 2120                   |
| show l2-learning global-mac-count<br>command.....                                                                       | 2122                   |
| show l2-learning instance command.....                                                                                  | 2123                   |



|                                                            |      |
|------------------------------------------------------------|------|
| show l2-learning interface command.....                    | 2125 |
| show l2circuit connections command.....                    | 2140 |
| show l2vpn connections command.....                        | 2148 |
| show lldp command.....                                     | 1734 |
| show lldp local-information command.....                   | 1737 |
| show lldp neighbors command.....                           | 1740 |
| show lldp remote-global-statistics<br>command.....         | 1746 |
| show lldp statistics command.....                          | 1748 |
| show mac-rewrite interface command.....                    | 2127 |
| show mld group command.....                                | 1525 |
| show mld interface command.....                            | 1529 |
| show mld statistics command.....                           | 1533 |
| show msdp command.....                                     | 1536 |
| show msdp source command.....                              | 1538 |
| show msdp source-active command.....                       | 1540 |
| show msdp statistics command.....                          | 1543 |
| show multicast backup-pe-groups<br>command.....            | 1547 |
| show multicast flow-map command.....                       | 1549 |
| show multicast forwarding-cache statistics<br>command..... | 1551 |
| show multicast interface command.....                      | 1553 |
| show multicast minfo command.....                          | 1555 |
| show multicast next-hops command.....                      | 1557 |
| show multicast pim-to-igmp-proxy<br>command.....           | 1560 |
| show multicast pim-to-mld-proxy<br>command.....            | 1562 |
| show multicast route command.....                          | 1564 |
| show multicast rpf command.....                            | 1570 |
| show multicast scope command.....                          | 1574 |
| show multicast sessions command.....                       | 1578 |
| show multicast snooping next-hops<br>command.....          | 1576 |
| show multicast snooping route command.....                 | 1581 |
| show multicast statistics command.....                     | 1585 |
| show multicast usage command.....                          | 1588 |
| show mvpn c-multicast command.....                         | 2154 |
| show mvpn instance command.....                            | 2157 |
| show mvpn neighbor command.....                            | 2160 |
| show mvrp statistics command.....                          | 1760 |
| show ospf context-identifier command.....                  | 1787 |
| show ospf database command.....                            | 1789 |
| show ospf3 database command.....                           | 1797 |
| show pim bootstrap command.....                            | 1591 |
| show pim interfaces command.....                           | 1593 |
| show pim join command.....                                 | 1596 |
| show pim mdt command.....                                  | 1617 |
| show pim mdt data-mdt-joins command.....                   | 1621 |
| show pim mdt data-mdt-limit command.....                   | 1623 |
| show pim neighbors command.....                            | 1625 |
| show pim rps command.....                                  | 1629 |
| show pim source command.....                               | 1653 |
| show pim statistics command.....                           | 1656 |
| show policer command.....                                  | 2096 |
| show policy damping command.....                           | 1434 |
| show rip general-statistics command.....                   | 2060 |
| show rip neighbor command.....                             | 2062 |
| show rip statistics command.....                           | 2064 |
| show ripng general-statistics command.....                 | 2070 |
| show ripng neighbor command.....                           | 2072 |
| show ripng statistics command.....                         | 2074 |
| show route active-path command.....                        | 1858 |
| show route advertising-protocol command.....               | 1863 |
| show route all command.....                                | 1868 |
| show route aspath-regex command.....                       | 1870 |
| show route best command.....                               | 1872 |
| show route brief command.....                              | 1875 |
| show route ccc command.....                                | 1877 |
| show route command.....                                    | 1852 |
| show route community command.....                          | 1878 |
| show route community-name command.....                     | 1880 |
| show route damping command.....                            | 1882 |
| show route detail command.....                             | 1887 |
| show route exact command.....                              | 1905 |
| show route export command.....                             | 1907 |
| show route export vrf-target command.....                  | 1910 |
| show route extensive command.....                          | 1912 |
| show route flow validation command.....                    | 1929 |
| show route forwarding-table command.....                   | 1931 |
| show route forwarding-table interface-name<br>command..... | 1945 |
| show route hidden command.....                             | 1948 |
| show route inactive-path command.....                      | 1951 |
| show route inactive-prefix command.....                    | 1954 |
| show route instance command.....                           | 1956 |
| show route label command.....                              | 1963 |
| show route label-switched-path command.....                | 1966 |
| show route martians command.....                           | 1970 |
| show route next-hop command.....                           | 1973 |
| show route no-community command.....                       | 1979 |
| show route output command.....                             | 1982 |
| show route protocol command.....                           | 1987 |
| show route range command.....                              | 1997 |
| show route receive-protocol command.....                   | 2001 |
| show route resolution command.....                         | 2010 |
| show route snooping command.....                           | 2013 |

|                                           |            |
|-------------------------------------------|------------|
| show route source-gateway command.....    | 2016       |
| show route summary command.....           | 2022       |
| show route table command.....             | 2026       |
| show route terse command.....             | 2054       |
| show sap listen command.....              | 1666       |
| show vpls connections command.....        | 2164       |
| show vpls flood event-queue command.....  | 2176       |
| show vpls flood instance command.....     | 2178       |
| show vpls flood route command.....        | 2180       |
| show vpls mac-table command.....          | 2182       |
| show vpls statistics command.....         | 2187       |
| si                                        |            |
| physical part of interface name.....      | 27         |
| signal polarity, serial interfaces.....   | 305        |
| sla-iterator-profile statement.....       | 847        |
| sla-iterator-profiles statement.....      | 848        |
| snooping (interface)                      |            |
| IGMP.....                                 | 1508       |
| snooping (membership)                     |            |
| IGMP.....                                 | 1513       |
| snooping (statistics)                     |            |
| IGMP.....                                 | 1517       |
| snooping routes, displaying.....          | 2013       |
| so                                        |            |
| physical part of interface name.....      | 27         |
| SONET Interface Speed                     |            |
| configuration.....                        | 108        |
| SONET interfaces                          |            |
| clock sources.....                        | 116        |
| damping interface transitions.....        | 145        |
| leaky bucket properties.....              | 134, 135   |
| MTU sizes.....                            | 95, 96, 97 |
| sonet-options statement.....              | 849        |
| SONET/SDH interfaces                      |            |
| status information, displaying            |            |
| standard.....                             | 1201       |
| Source class field, content.....          | 965        |
| source gateway addresses, displaying..... | 2016       |
| source statement.....                     | 851        |
| source-address-filter statement.....      | 852        |
| source-class-usage statement.....         | 853        |
| usage guidelines.....                     | 235        |
| source-filtering statement.....           | 724, 854   |
| sp                                        |            |
| physical part of interface name.....      | 27         |
| speed statement                           |            |
| Ethernet.....                             | 855        |
| MX Series DPC.....                        | 856        |
| SONET/SDH.....                            | 857        |
| usage guidelines.....                     | 105        |
| SPF calculations, displaying.....         | 1816       |
| spid1 statement.....                      | 857        |
| spid2 statement.....                      | 858        |
| stacked VLAN-tag framing                  |            |
| VLAN ID list.....                         | 943        |
| stacked-vlan-ranges statement.....        | 859        |
| stacked-vlan-tagging statement.....       | 860        |
| start-end-flag statement.....             | 861        |
| static PPPoE statements                   |            |
| pppoe-underlying-options.....             | 783        |
| static subscribers                        |            |
| interfaces statement.....                 | 616        |
| pppoe-underlying-options statement.....   | 783        |
| static-interface statement                |            |
| PPPoE.....                                | 862        |
| statistics                                |            |
| Layer 2 bridging, displaying.....         | 2117       |
| LLDP.....                                 | 1733       |
| stm1                                      |            |
| physical part of interface name.....      | 27         |
| stm16                                     |            |
| physical part of interface name.....      | 27         |
| stm4                                      |            |
| physical part of interface name.....      | 27         |
| subscriber                                |            |
| ANCP.....                                 | 1344       |
| subscriber interface statements           |            |
| access-concentrator.....                  | 387        |
| demux0.....                               | 485        |
| family.....                               | 544        |
| interfaces.....                           | 616        |
| mode.....                                 | 683        |
| pppoe-underlying-options.....             | 783        |
| rpf-check.....                            | 821        |
| unit.....                                 | 908        |
| unnumbered-address.....                   | 918        |
| supplicant statement                      |            |
| single (mode).....                        | 863        |
| supplicant-timeout statement.....         | 864        |
| support, technical See technical support  |            |
| swap statement                            |            |
| Gigabit Ethernet IQ interfaces.....       | 865        |
| swap-push statement                       |            |
| Gigabit Ethernet IQ interfaces.....       | 866        |
| swap-swap statement                       |            |
| Gigabit Ethernet IQ interfaces.....       | 867        |
| switch-card chassis SCC.....              | 34         |

|                                            |            |                                                     |          |
|--------------------------------------------|------------|-----------------------------------------------------|----------|
| switch-fabric chassis SFC.....             | 36         | terminate statement                                 |          |
| switch-options statement.....              | 867        | PPPoE service name tables.....                      | 880      |
| switch-port statement                      |            | test msdp command.....                              | 1668     |
| access switching.....                      | 868        | then statement.....                                 | 771      |
| switching-mode statement.....              | 868        | hierarchical policer.....                           | 880      |
| symbol-period statement.....               | 869        | threshold statement.....                            | 881      |
| syntax conventions.....                    | xlili      | configuring.....                                    | 135      |
| syslog statement                           |            | timeslots statement.....                            | 882      |
| usage guidelines.....                      | 149        | tlv statement.....                                  | 460      |
| system processes                           |            | tm statement.....                                   | 883      |
| configuration statements.....              | 382        | usage guidelines.....                               | 302      |
| system-priority statement                  |            | tm-polarity statement.....                          | 883      |
| LACP.....                                  | 871        | usage guidelines.....                               | 305      |
| <b>T</b>                                   |            | to statement.....                                   | 771      |
| t1                                         |            | traceoptions statement                              |          |
| physical part of interface name.....       | 27         | ICCP.....                                           | 581      |
| T1 interfaces                              |            | interface processes.....                            | 886      |
| byte encoding.....                         | 441        | interfaces.....                                     | 884      |
| MTU sizes.....                             | 95, 96, 97 | LACP.....                                           | 888      |
| status information, displaying.....        | 1242       | PPPD.....                                           | 890      |
| t1-options statement.....                  | 872        | PPPD processes.....                                 | 133, 314 |
| T1600 routers                              |            | PPPoE.....                                          | 893      |
| configured in a routing matrix.....        | 36         | tracing flags                                       |          |
| t3                                         |            | all.....                                            | 311      |
| physical part of interface name.....       | 27         | event.....                                          | 311      |
| T3 interfaces                              |            | ipc.....                                            | 311      |
| C-bit parity mode.....                     | 444, 710   | media.....                                          | 311      |
| MTU sizes.....                             | 95, 96, 97 | tracing operations                                  |          |
| status information, displaying.....        | 1267       | PPPD.....                                           | 133, 314 |
| t3-options statement.....                  | 875        | traffic distribution mechanisms for Virtual Chassis |          |
| t310 statement.....                        | 873        | targeted distribution.....                          | 879      |
| t391 statement.....                        | 873        | transient interfaces.....                           | 4, 5     |
| t392 statement.....                        | 874        | transitions                                         |          |
| T640 routers.....                          | 34         | damping.....                                        | 145      |
| tag-protocol-id statement                  |            | translate-discard-eligible statement.....           | 726, 895 |
| TPID to rewrite.....                       | 877        | translate-fecn-and-becn statement.....              | 726, 896 |
| TPIDs expected to be sent or received..... | 876        | translate-plp-control-word-de statement.....        | 896      |
| tap                                        |            | transmit clock sources.....                         | 116      |
| physical part of interface name.....       | 27         | transmit-bucket statement.....                      | 897      |
| targeted traffic distribution              |            | configuring.....                                    | 135      |
| Virtual Chassis.....                       | 879        | transmit-clock statement.....                       | 897      |
| targeted-broadcast statement.....          | 878        | usage guidelines.....                               | 301      |
| targeted-distribution statement            |            | transmit-period statement.....                      | 898      |
| aggregated Ethernet.....                   | 879        | transmit-weight statement                           |          |
| technical support                          |            | ATM2 IQ CoS Forwarding Class.....                   | 899      |
| contacting JTAC.....                       | xlvi       | ATM2 IQ Virtual Circuit.....                        | 900      |
| tei-option statement.....                  | 879        | traps statement.....                                | 901      |
|                                            |            | usage guidelines.....                               | 150, 180 |

|                                      |               |
|--------------------------------------|---------------|
| traps statements                     |               |
| enhanced subscriber management.....  | 901           |
| Tri-Rate Ethernet copper interfaces  |               |
| speed.....                           | 105           |
| Tri-Rate Ethernet interfaces         |               |
| MTU sizes.....                       | 98            |
| trigger statement.....               | 902           |
| trigger-link-failure statement.....  | 903           |
| Trivial Network Protocol family      |               |
| interface addresses.....             | 187           |
| on logical interfaces.....           | 186           |
| trunk port                           |               |
| VLAN ID list.....                    | 934           |
| trunk-bandwidth statement.....       | 903           |
| trunk-id statement.....              | 904           |
| ttn statement.....                   | 904           |
| tunnel statement.....                | 905           |
| TX Matrix Plus router                |               |
| interface naming.....                | 36            |
| chassis.....                         | 39            |
| TX Matrix router                     |               |
| interface naming.....                | 34            |
| chassis.....                         | 39            |
| <b>U</b>                             |               |
| umd                                  |               |
| physical part of interface name..... | 27            |
| underlying-interface statement.....  | 906           |
| unframed statement.....              | 727, 907      |
| unicast RPF.....                     | 217           |
| example configuration.....           | 225, 226      |
| fail filters.....                    | 219, 225, 226 |
| loose mode.....                      | 221           |
| routing asymmetry.....               | 219           |
| strict mode.....                     | 220           |
| VPNs.....                            | 224           |
| unicast-reverse-path statement       |               |
| usage guidelines.....                | 226           |
| unidirectional link mode.....        | 138           |
| overview.....                        | 137           |
| unidirectional statement.....        | 907           |
| unit numbers.....                    | 168           |
| unit statement.....                  | 911           |
| interfaces.....                      | 908           |
| logical interfaces                   |               |
| usage guidelines.....                | 168           |
| unnumbered interfaces                |               |
| demux.....                           | 196           |
| Ethernet.....                        | 196           |
| preferred source address.....        | 785           |
| unnumbered-address statement         |               |
| demux interface.....                 | 917           |
| dynamic profiles.....                | 918           |
| Ethernet.....                        | 920           |
| PPP.....                             | 921           |
| preferred source address             |               |
| usage guidelines.....                | 197           |
| usage guidelines.....                | 196           |
| up-count statement.....              | 922           |
| user-prefix statement                |               |
| dynamic VLAN authentication.....     | 923           |
| username-include statement           |               |
| dynamic VLAN authentication.....     | 924           |
| <b>V</b>                             |               |
| vbr statement.....                   | 925           |
| vc-cos-mode statement.....           | 926           |
| vc4                                  |               |
| physical part of interface name..... | 27            |
| vci statement.....                   | 927           |
| vci-range statement.....             | 928           |
| verification                         |               |
| static route.....                    | 233           |
| Virtual Chassis                      |               |
| module redundancy.....               | 654           |
| redundancy                           |               |
| module.....                          | 654           |
| targeted traffic distribution.....   | 879           |
| virtual private LAN service See VPLS |               |
| virtual-switch statement.....        | 928           |
| VLAN CCC encapsulation               |               |
| encapsulation overhead.....          | 102           |
| VLAN IDs.....                        | 935           |
| VLAN tagging.....                    | 940           |
| vlan-id statement                    |               |
| 802.1Q VLANs.....                    | 930           |
| ATM-to-Ethernet cross-connect.....   | 929           |
| Ethernet interfaces.....             | 930           |
| interface in bridge domain.....      | 929           |
| rewriting at ingress or egress.....  | 931           |
| vlan-id-list statement               |               |
| bridge domain.....                   | 934           |
| Ethernet VLAN circuit.....           | 932           |
| vlan-id-range statement.....         | 935           |
| Ethernet interfaces.....             | 935           |

|                                          |          |          |                                             |
|------------------------------------------|----------|----------|---------------------------------------------|
| vlan-ranges statement.....               | 936      | <b>X</b> |                                             |
| vlan-rewrite statement.....              | 937      | xe       |                                             |
| vlan-rule statement.....                 | 938      |          | physical part of interface name.....27      |
| vlan-steering statement.....             | 939      | xt       |                                             |
| vlan-tagging statement.....              | 940      |          | physical part of interface name.....27      |
| vlan-tags statement                      |          | <b>Y</b> |                                             |
| dual-tag framing.....                    | 941      |          | yellow-differential-delay statement.....954 |
| stacked VLAN tags.....                   | 943      | <b>Z</b> |                                             |
| vlan-tags-outer statement.....           | 944      |          | z0-increment statement.....727, 955         |
| vlan-vci-ccc encapsulation               |          |          |                                             |
| ATM-to-Ethernet interworking.....        | 254      |          |                                             |
| vlan-vci-tagging statement.....          | 944      |          |                                             |
| ATM-to-Ethernet interworking.....        | 254      |          |                                             |
| VLANs                                    |          |          |                                             |
| automatically removing subscribers.....  | 812      |          |                                             |
| configuring VLAN ranges.....             | 859, 936 |          |                                             |
| vpi statement                            |          |          |                                             |
| ATM CCC cell-relay promiscuous mode..... | 945      |          |                                             |
| Logical Interface and Interworking.....  | 947      |          |                                             |
| virtual path.....                        | 946      |          |                                             |
| VPLS                                     |          |          |                                             |
| connections, displaying.....             | 2164     |          |                                             |
| statistics, displaying.....              | 2187     |          |                                             |
| vpls protocol family                     |          |          |                                             |
| interface addresses.....                 | 187      |          |                                             |
| on logical interfaces.....               | 186      |          |                                             |
| VPN routing and forwarding See VRF       |          |          |                                             |
| VPNs                                     |          |          |                                             |
| unicast RPF.....                         | 224      |          |                                             |
| VRF                                      |          |          |                                             |
| route export, displaying.....            | 1910     |          |                                             |
| VRF table label                          |          |          |                                             |
| traffic statistics.....                  | 963      |          |                                             |
| VRRP                                     |          |          |                                             |
| configuration statements.....            | 378      |          |                                             |
| vrrp                                     |          |          |                                             |
| failover-delay.....                      | 543      |          |                                             |
| vsp                                      |          |          |                                             |
| physical part of interface name.....     | 27       |          |                                             |
| vt                                       |          |          |                                             |
| physical part of interface name.....     | 27       |          |                                             |
| vtmapping statement.....                 | 947      |          |                                             |
| <b>W</b>                                 |          |          |                                             |
| warning statement.....                   | 948      |          |                                             |
| wavelength statement.....                | 949      |          |                                             |
| west-interface statement.....            | 953      |          |                                             |
| working-circuit statement.....           | 954      |          |                                             |

